Strategies for the Regeneration of Degraded Rural Landscapes:

The Design of a “Padstal” on the Crossing of Route 62 and the Seweweekspoort Pass, Klein Karoo

Inge Conradie - 2020

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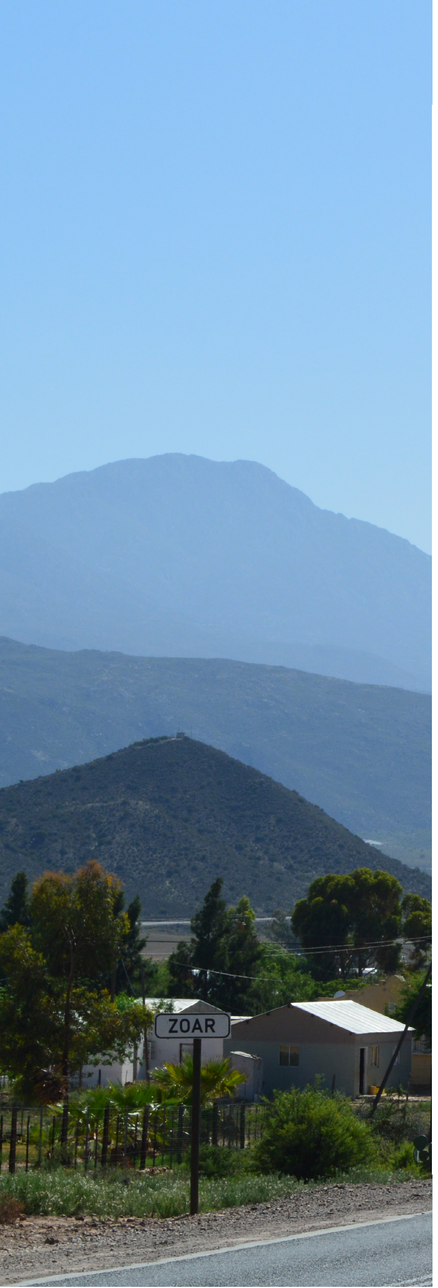

Declarations

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Strategies for the Regeneration of Degraded Rural Landscapes:
The Design of a "Padstal" on the Crossing of Route 62 and the Seweweekspoort Pass, Klein Karoo

DECLARATION:
In accordance with Rule G4.6.3, I hereby declare that the above-mentioned treatise/ dissertation/ thesis is my own work and that it has not previously been submitted for assessment to another University or for another qualification.

SIGNATURE: I Conradie

DATE: 9 September 2020

Change the World

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My gratitude is expressed to each and every person who contributed in support and guidance towards my master's degree.

In particular my fifth year supervisor, Andrew Palframan, for his honest critique and encouragement.

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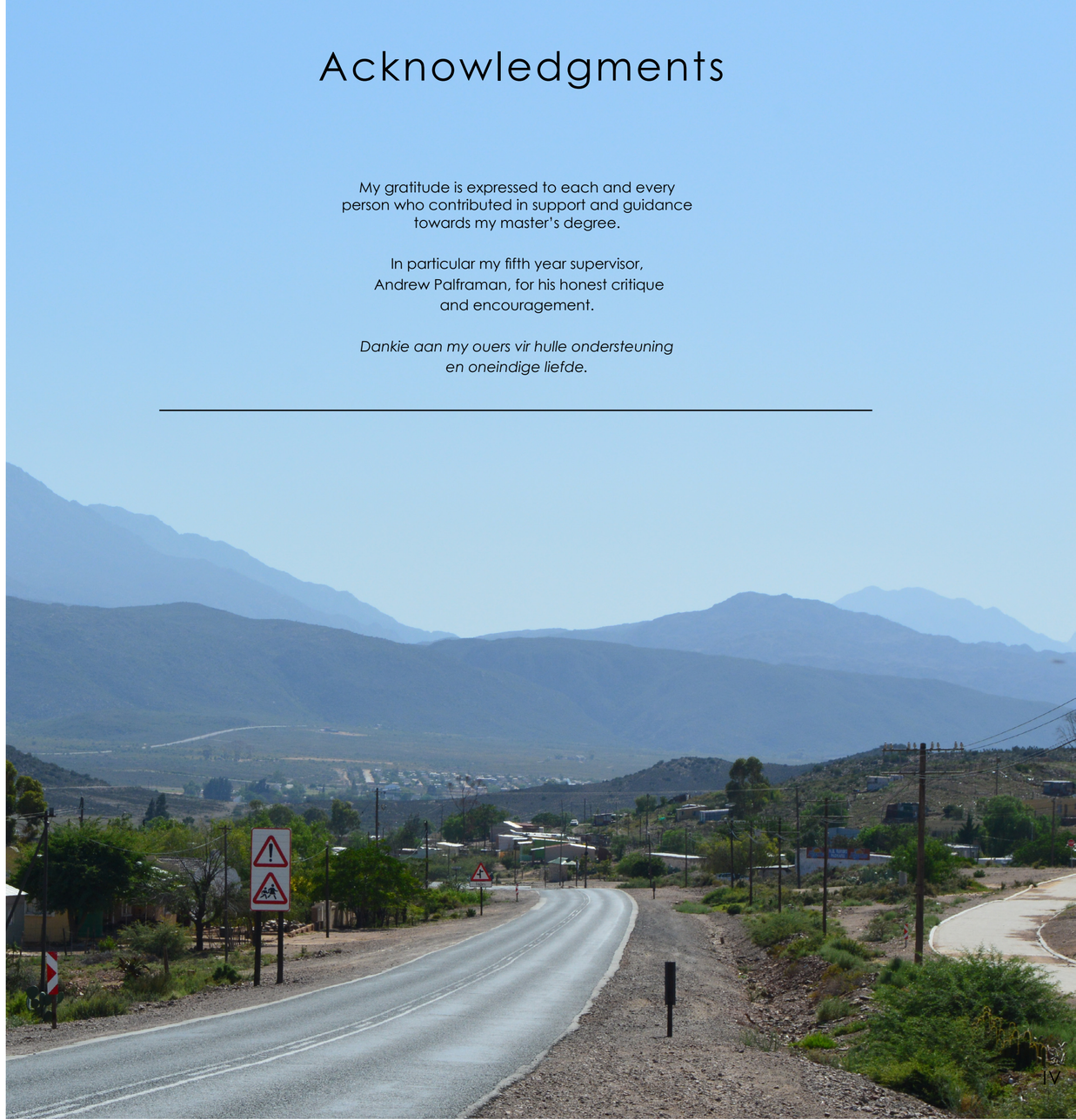


Abstract

[What's it all about?]

[The rural landscape is calling for a change]

The livelihood of subsistence farmers of the Little Karoo sister towns, Zoar and Amalienstein, face many challenges such as the lack of economic opportunity, unemployment and drought that ultimately leads to poverty.

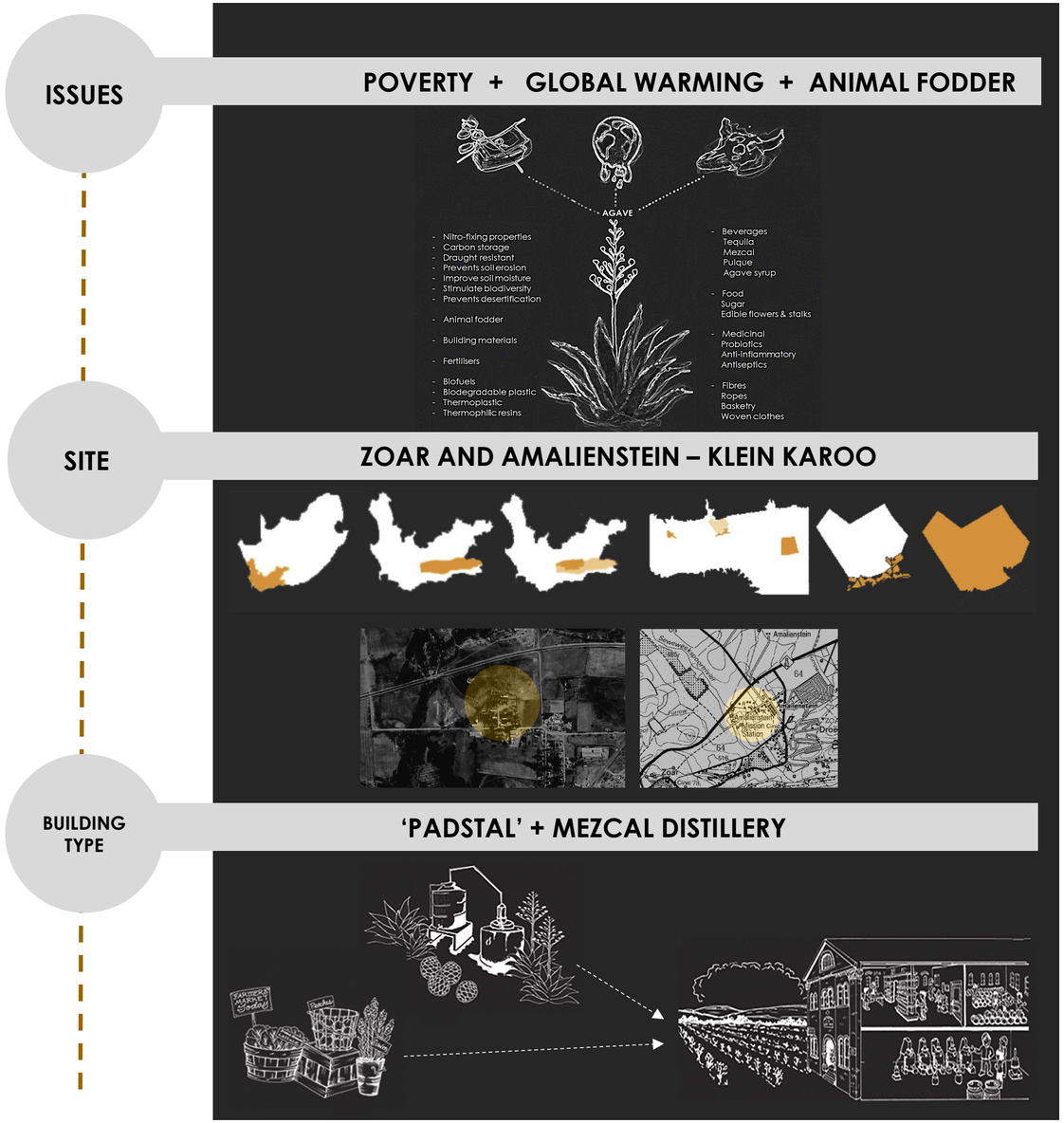
This dissertation investigates the potential of a collective tourism and agricultural cooperative programme, which regenerates the rural landscape into a productive one through an architectural intervention.

By developing a productive landscape that ignites rural livelihoods, the challenges can be transformed into opportunities for these impoverished communities.

Research into agave-based agroforestry as a driver to combat global warming will aim to establish staple household security. It will be a means of inserting informal farm production into the tourism market through the built environment.

The productive landscape, driven from an agave-based agroforestry and livestock feeding model, utilises the living and natural systems existing on the site. Together with regenerative architecture, it will structure the "building blocks" of the Agave-'padstal'.

The strategic position of this 'padstal', on the crossing of the Cape Route 62 and the SeweweekspoortPass, would create a node of destination.



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INTRODUCTION CHAPTER

[Ch. 01]

Background

1.1

This treatise developed from a preoccupation with the high poverty rate and the constant, dire need for animal food due to water shortages in rural settlements caused by global warming.

The rural settlements of Zoar and Amalienstein, established in the early 19th Century as mission stations, are situated approximately 22 kilometers from Ladismith, on the R62, leading to Calitzdorp and Oudtshoorn. The R62 is heavily promoted as a tourism destination in its own right and provides a brand from which tourism operations and settlements can benefit if properly promoted. Zoar and Amalienstein both abut this route.

Amalienstein is also ideally situated at the intersection of the R62 and the R363, the Seweweekspoort Pass, but there is no incentive for tourists to cross into the settlement rather than turning right or left. Both of these settlements have a by-pass nature.

These settlements were initially self-sustainable as they have a close relationship with the Nels River. Their primary source of livelihood was small scale farming on garden plots irrigated by the river. For years people made a living from their garden plots, but this has declined due to droughts and the excessive extraction of water higher up in rivers for irrigation.

Many small-scale farmers in the Little Karoo are struggling to survive due to water scarcity and the lack of access to markets to sell their produce. Due to poverty, small-scale and subsistence farmers can hardly adopt new technologies which require high investments (Kibirige, 2016).

The 7 000 ha farm, Amalienstein, was made available to the Zoar community under the Land Redistribution for Agricultural Development Programme, by the South African government. Of the 5 000 people living in the community, fewer than 30% are employed on the farm which unfortunately currently runs at a substantial loss.

The local communities of Zoar and Amalienstein are usually described as mostly poor. Rural communities are often poor – the lifestyle of the community often depends mainly on agriculture and livestock farming (Fourie, 2008). The South African rate of poverty is 45%, but in rural areas this figure rises to more than 50%. Kannaland is rated the highest poverty area in the Western Cape and is one of the two poorest municipalities.

Although the Little Karoo has vast economical developmental potential, especially in terms of agriculture and agro-processing, the lack of water prevents agricultural progress and growth. "There isn't any work here," says Hendrik January, chairperson of the Zoar Community Trust. "A handful of people are employed at Amalienstein and on other farms in the area. The rest of the people depend on seasonal and piece work."

The inhabitants of the more recent development, Protea Park, a low-income housing township in Amalienstein, have no means of livelihood other than commuting to neighbouring farms or towns for work. The resource-poor rural households are the most affected by the resultant food insecurity and unemployment (Van der Merwe and Beukes, 2008; Beukes et al, 2008). South African rural farmers are not an exception to these challenges.

Agriculture is the backbone of Kannaland's economy. Fruit and dairy farming are the biggest contributors to the area's agricultural output (Fourie, 2008).

Increasing temperatures and less and more erratic rainfall will exacerbate conflicts over water allocation and the already critical state of water availability (Thomas, 2008).

The poor in rural and dry areas will suffer the most from these changes and they will require cheap and accessible strategies to adapt to erratic weather (Tirado and Cotter, 2010).

1.2

[problem]

The core problem for these two settlements is the lack of regenerating farming strategies that adapt to erratic weather conditions, as well as the lack of access to opportunities to sell locally grown and manufactured products.

Other aspects of the problem are related to the lack of reference of these two communities as tourism destinations, the under utilisation of the tourism potential of their cultural heritage and their connection to the R62 as well as the Seweweekspoort Pass.

[aim]

The aim is to develop a productive landscape that regenerates the rural communities of Zoar and Amalienstein through sustainable, regenerative farming methods and techniques together with the design of a community and tourist trading complex, around an important node that would serve as a gateway to these communities. This design through regenerative architectural principles, would create a platform for tourism and establish the communities as tourism destinations.

[objective]

The objectives of the research study are as follows:

To understand the particular programme of the padstal and all the associated components.

The following components of the 'padstal' will be investigated:
- the 'shop' (the 'padstal' as we know it)
- the raw product processing facility
- the farm / agriculture

To understand the site and its characteristics, across scales.

To understand and articulate constraints and informants which will become design drivers for the 'padstal'.

To investigate regenerative architecture and productive landscape's principles.

1.3

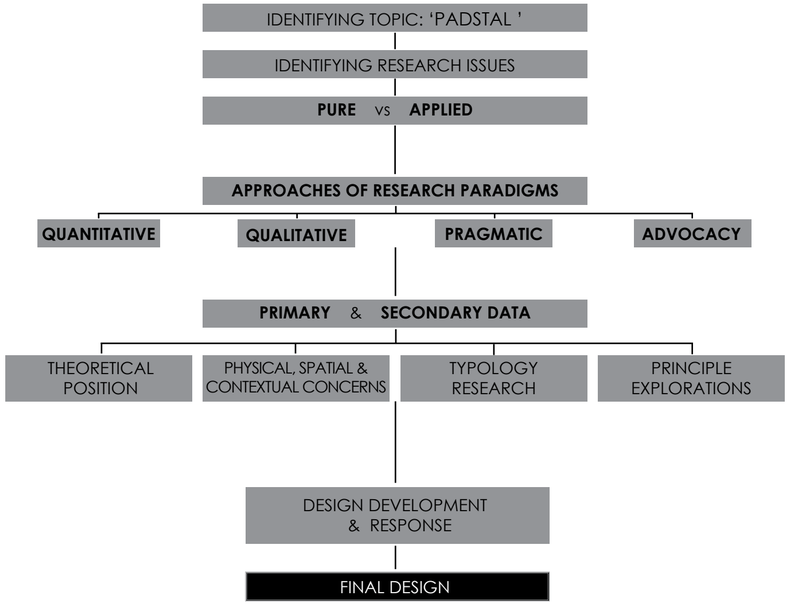


Figure 1.1: Structure of document research
Source: Author (2020)

[document structure]

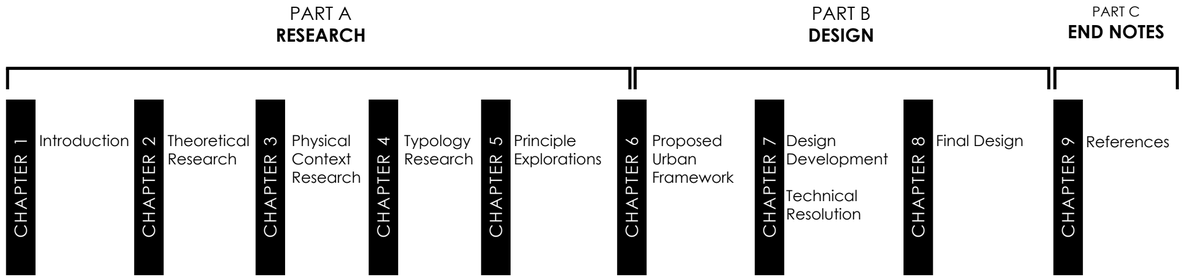


Figure 1.2: Structure of document
Source: Author (2020)

1.4

Methodology

This study is primarily descriptive and exploratory as it seeks to illustrate the complexities of the subject.

Full Definition of methodology
1: a body of methods, rules, and postulates employed by a discipline : a particular procedure or set of procedures
2: the analysis of the principles or procedures of inquiry in a particular field

Methodology is the theory that underpins research. Research methodology is a collective term for the structured process of conducting research. Research methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out. Research methodology aims at the employment of the correct procedures to find out solutions (Goundar, 2012).

There are four main approaches of research paradigms namely qualitative, quantitative, pragmatic and advocacy research. The most common paradigms are qualitative and quantitative research. The classification of quantitative and qualitative research is based on the type of data and methods used.

Quantitative research is a structural and statistical tool designed to collect cold, hard facts that can be transferred into numbers. Data from quantitative research can help you see the big picture. The quantitative research focuses on those aspects of social behavior which can be quantified and patterned rather than just finding them out and interpreting their meanings the people bring to their own action (Rahman, 2016). The goal of gathering quantitative data is to understand, describe, and predict the nature of a phenomenon, particularly through the development of models and theories (Lucas-Alfieri, 2015).

Qualitative research is a primarily exploratory research that collects information that seeks to describe a topic more than measure it. It is a realistic study of the daily life of people in their natural setting to understand the deeper meaning of human behaviour and emotions within the framework of the social and cultural milieu within which that behaviour takes place. This involves an interpretive, naturalistic approach to its subject matter, it attempts to make sense of, or to interpret, phenomena in terms of the meaning people bring to them (Denzin and Lincoln, 2003).

As qualitative research is not so prescriptive as a statistical research like, for example, quantitative research, and there are usually no variables that should be controlled. It leads to a more flexible structure that allows for more freedom of development. Data collected from qualitative research methods is descriptive, therefore, it is easy to draw inferences from it.

The descriptive nature of qualitative research enables readers to understand the meaning attached to the experience, the distinct nature of the problem and the impact of the problem. A holistic picture of the phenomenon in question can be developed due the versatile nature of qualitative research.

In the scope of architectural research, a qualitative research methodology has been applied to this research paradigm, where the main aim is placed on inductive reasoning to analyse data in order to narrow the scope of study. A deductive approach is aimed at testing a theory that is normally associated with quantitative research. Inductive reasoning is a method of reasoning in which the premises are viewed as supplying some evidence for the truth of the conclusion; this is in contrast to deductive reasoning.

While the conclusion of a deductive argument is certain, the truth of the conclusion of an inductive argument may be probable, based upon the evidence given. Although inductive reasoning is logical, it gives leeway for different ways of reasoning, within the logic of the argument. These can all lead to a logical conclusion. This study is essentially inductive in nature.

To determine the goal of the research paradigm, pure research will be conducted without any specific goal. Applied research will also be used as this research is conducted with specific goals in mind to solve specific and practical problems.

Pure research provides the concepts that generate the theory for applied research for solving specific problems. The main motivation of pure research is to expand man's knowledge, not to create or invent something. Applied research is designed to solve practical problems of the modern world, rather than to acquire knowledge for knowledge's sake.

In order to draw conclusions and gain insight into the three main areas of research, namely the site, the programme and the theory, both primary and secondary data sources will be used. Data retrieved first-hand by the author is known as primary data and includes methods such as photographs taken on site by the author, site analysis and investigation, sketches, diagrams and observations. This raw data will form the basis on which the approach to the site will be based.

Data obtained from pre-existing sources like books, articles, maps, case studies, diagrams and photos not generated by the author, is known as secondary data. To position the treatise in terms of the appropriate theoretical framework, results from secondary data will be used. In order to fulfill the scope of work, a range of primary and secondary data sources will be utilised to gain an in-depth understanding of the issues associated with the proposed project. Participant observation will be achieved through site visits.

Site visits will be used to experience the site and to gain an understanding of the receiving environment. It will also allow for the collection of information and identify important information applicable to the study. This research methodology will also allow for a photographic survey within the area of study and of the surrounding landscape.

Systematic mapping of the site will be done to provide the foundation for a development plan and design approach. Mapping will give details about the spatial dimensions of the site, the agricultural and tourism value of the site, access and circulation needed, the nature of the site, the physical conditions surrounding the site, as well as external forces such as movement patterns and climatic conditions.

Precedent studies will be used to seek guidance and to serve as example and to justify the development plan and design approach. These studies will be used as an inspiration and to aid the design process from concept to final design. Approaches employed by previous projects will be studied and analysed in order to gain a more pragmatic view of what remediation strategies could be applied to solve the problem.

“ part a ”

RESEARCH

Part “A” of the dissertation is the documentation and analysing of relevant research done as stated in the methology. This part acts as a intoduction to the manifestation of a proposed design response documented in Part “B”.

THEORETICAL POSITION

[Ch. 02]

2.1

[part] A

Introduction:

General Information & Chapter Outline:

The discussion will follow a coherent line of argument that starts with gaining an understanding of what Post-Productivism is, how the focus of contemporary agriculture production shifted to the demand for amenities, ecosystem services and preservation of landscapes. This is followed by an investigation of Productive Landscapes and how this theory can be the answer to reconfigure agriculture and the countryside for rural development.

The dynamic and holistic process of Regenerative Architecture and Regenerative Agriculture and the notion that a place can be healed and regenerated through human development will be researched.

The last part of this chapter theoretically sets out to understand and apply the thoughts and theorems around "Place" and "Linkage" to the application of a rural roadside site. Linking the architectural design to the context in which it sits, while looking at landscape architect, urban designer and author of *Finding Lost Space,* Roger Trancik's three approaches, will help with integration between them.

As this project is concerned with creating appropriate architecture in a very harsh, arid landscape, a short discussion on landscape typologies will be done. It will look into the works of Kevin Lynch in his book *The Image of the City* and Christian Norberg-Schultz in his book *Genius Loci - Towards Phenomenology of Architecture*.

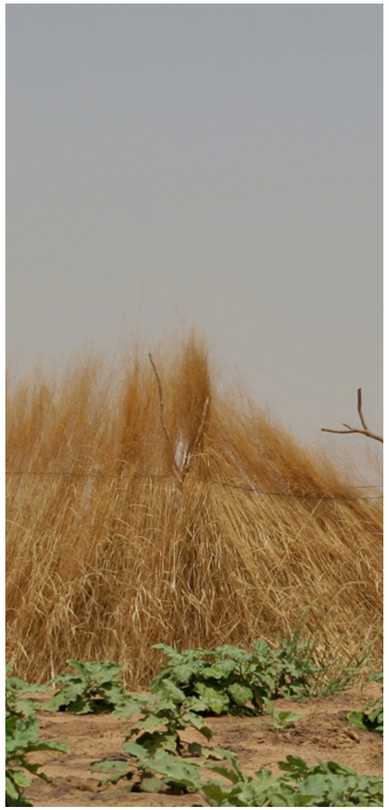
Looking and applying Stan Allen's *Field Conditions*, and how they iconoclastically proposes an architecture not concerned with tectonic, built form, but primarily dealing with the abstract concepts of space and spatial relationships within a hypothetical, dynamic field.

Investigation into these theories aims to aid the design process. It will help make certain decisions concerned with regenerating and producing an architecture of a certain character that relates to the natural environment, the community and tourists to create the Agave-Padstal in a natural, rural landscape.

The Rural Face of Poverty

In 2007 the world faced a turning point when, for the first time in history according to the United Nations, more people lived in urban areas than in rural areas. However, poverty still has an overwhelmingly rural face and the rural economy and society still perform a vital part in the development process and in people's well-being (Kay, 2009). Of around 1.4 billion poor worldwide, 70 percent reside in rural areas of developing countries (Rehman, 2018).

Current concerns about global warming, deforestation, the food crisis, genetically modified organisms (GMOs), agrofuels, food sovereignty, famines, rural poverty and international migration, among others; reveal the continuing relevance of the agrarian and rural problem (Kay, 2009).



"To retain the essence of the countryside and to capture its expansive beauty and to sustain the village's engagement with the land through work, leisure and response, it is perhaps necessary to acknowledge that the distinct separation, conceptually as well as literal, between rural and urban, human and nature, architecture and landscape should be whittled away."

Christopher Lee, Countryside City

Post-Productivism

2.2

The concept of 'post-productivism' was introduced in the 1990s where the focus of contemporary agriculture production shifted to a demand for amenities, ecosystem services and preservation of landscapes. Post-productivism is a complex concept that according to Wilson (2001), encompasses environmental, economic, social and cultural dimensions, thus stretching over several disciplinary domains.

This discourse challenged 'productivism', which according to Woods (2011) refers to a discourse of agricultural organisation in which the function of farming was singularly conceived as the production of food and fibre, and which prioritised increasing agricultural production over all other considerations.

Productivism has had a great effect on the countryside as a whole, transforming social structures, environmental conditions and landscapes in order to reach the highest agricultural production possible (Woods, 2011). Intensification, concentration, and specialisation characterise productivist agriculture (Ilbery & Kneafsey, 1998).

The theoretical term "post-productivism" (Halfacree 2006) refers to the changing nature of the rural economy to include tourism, lifestyle activities, art, crafts, boutique towns, sport, recreation and nature conservation.

Niche agricultural products, such as organic farming, are also part of this structural rural change. The key driver of post-productivism is that urbanites move to the country on a permanent basis (to invest and obtain an improved quality of life), or on a temporary basis (e.g. tourism).

This creates a range of new employment and entrepreneurial opportunities (Atkinson, 2014). In the light of the "post-productivist turn" in some rural areas, a growing linkage is that between tourism and agriculture.

A suggested feature is the changed emphasis from commodity to non-commodity outputs, including environmental services (including recreation, amenity and ecosystem services) (Mather et al, 2006).

Thus, they argue, using 'post-productivism' to describe this changed emphasis from material production to service provision.

As Van der Ploeg et alia (2000) put it: "rural development theory is not about the world as it is – it is about the way agriculture and the countryside might be reconfigured". A productive landscape can be the answer to reconfigure agriculture and the countryside for rural development.

Post-productivism embraces both macro and micro changes, and hence captures a whole array of rural issues, such as problems concerning land-use planning, rural development, social and economic change both on-farm as well as off-farm (Evans, Morris & Winter, 2002).

	Productivism	Post-Productivism
Paradigm	Agricultural production is the primary, or only, purpose of arable land- "farms are for farming".	Agriculture is integrated within a broader set of rural and environmental objectives where production is not the primary purpose of arable land.
Approach to Land Use Policy	**Land Sharing:** Separating land for conservation from land for crop production.	**Land Sharing:** Integrating biodiversity conservation and food production on the same land.
Landscape Characteristics (potential)	Homogenous landscape where agriculture and environment are segregated into spaces dedicated to either use.	Multifunctional/heterogeneous landscape where agriculture and environment co-exist and fewer spaces are dedicated to either use.

Figure 2.1: Productivism vs Post-Productivism
Source: Author (2020)

Productive Landscapes

2.3

Productive landscape is based on the mixture of uses, where they all support each other to create a harmonious space. The aim is to envision a combination of all uses and move away from the separation of the landscape. By using the landscape productively, it will result in a stronger character of the space. To build a better local economy the transports costs are cut between research, production, processing and retail.

The productive use of land is in increasing demand by rural settlements because of drought. Through productive landscapes it can solve the problem of underutilised farm land on the outskirts of the rural settlements.

By redefining and diversifying the existing landscape, the overall life of the rural settlements will improve. The aim of this intervention is to integrate the local people while increasing the interest of agriculture and bringing social welfare to this society (see chapter 4 – Agave -based agroforestry).

Productive landscapes are the future. They should be thought of as an integration of production and landscape design. Moving away from cost ineffective economies, the vision is a diverse landscape based on the local character. It is about breaking the barriers and furthermore emphasising the existing potentials in the rural under utilised space. These spaces should yet again become the breadbasket of the settlements.

A dynamic productive landscape is resilient. Easily adaptable to change, it replies to the vulnerabilities of the future. Possible future scenarios do not degrade the landscape, but change it in a way that is possible. In this rural context, it is not only about economy and profit, but also about how the integration of space can generate a multi-purpose programme in an arid Karoo landscape with extreme climate changes.

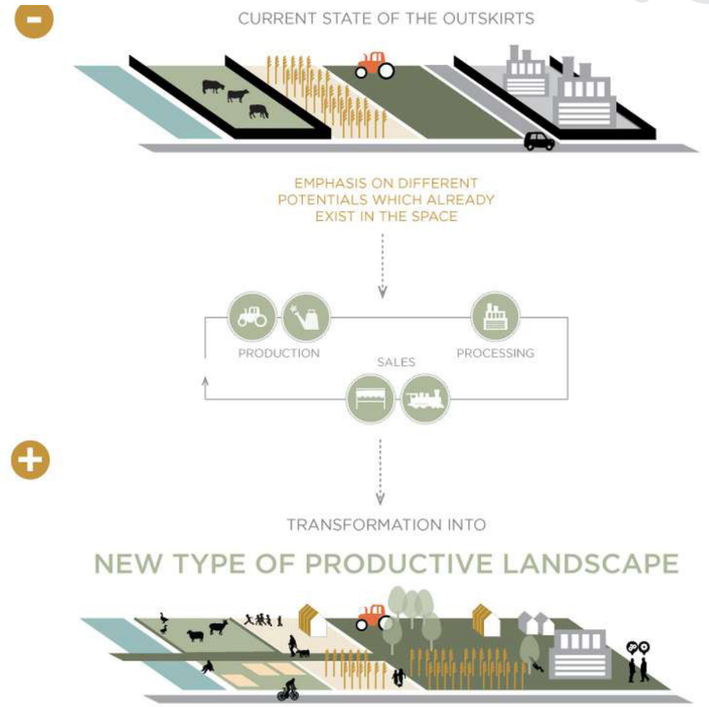


Figure 2.2: Productive Landscape
Source: Kante, Mali & Bogavic (2016)

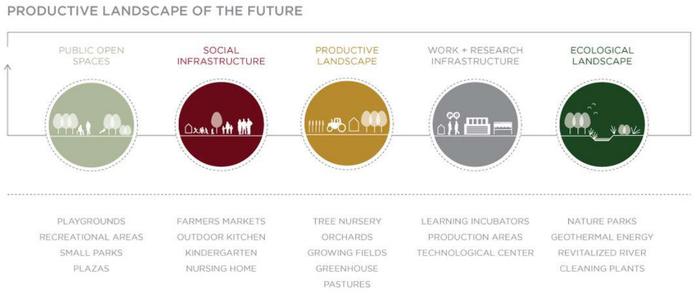


Figure 2.3: Productive Landscape of the Future
Source: Kante, Mali & Bogavic (2016)

Regenerative Architecture

2.4

"We can design buildings that provide resource-efficient and beautiful learning and working spaces. The hope is that these spaces will teach and inspire these users to think beyond sustaining and to reach for a future that is about regenerating." (Unknown)

Climate change is the catalyst of hundreds of thousands of deaths every year world wide. Extreme weather conditions, natural disasters and droughts are wreaking havoc on ecosystems and economies, costing governments billions. In response humanity should be working harder to reduce its carbon emissions and build sustainable relationships with nature. And it all starts with where we live and work.

Because the building-, construction- and related fields contribute to 23 percent of the world's carbon emissions, it is imperative that a paradigm shift and transformation takes place in the way we design and build. Professor of Experimental Architecture at the Department of Architecture, Planning and Landscape at Newcastle University, Rachel Armstrong, believes the biggest concern is that buildings are largely based on Victorian technology.

She considers that this involves a one-way transfer of energy from our environment into our homes and cities. She also comments that this way of thinking is not sustainable and the only way it is possible for us to construct genuinely sustainable homes and cities is by connecting them to nature, not insulating them from it.

Simply designing sustainable buildings is not enough anymore. That is why leaders in the industry have dedicated years of research to various forms of Living and Regenerative Architecture, which will be a far more effective approach over the long-term (Holl,2020).

In a COST (European Cooperation in Science and Technology) research report entitled Sustainability, Restorative to Regenerative the authors explain the three concepts as follows:

- **Sustainability:** Limiting impact. The balance point where we give back as much as we take.
- **Restorative:** Restoring social and ecological systems to a healthy state.
- **Regenerative:** Enabling social and ecological systems to maintain a healthy state and to evolve.

Regenerative architecture is the practice of engaging the natural world as the medium for, and generator of the architecture. It has two focuses; it is an architecture that focuses on conservation and performance through a focused reduction on the environmental impacts of a building.

[strategies]

Regenerative Architecture strategies include:

- Green roofs and skins
- The capture and storage of rainwater
- Wastewater treatment
- Generating and storing energy
- Sequestering carbon emissions
- Thermal efficient construction
- Creating a suitable habitat for lost wildlife and plants
- Growing food
- Increasing biodiversity
- Addressing pollution
- A building with no negative health impact on inhabitants
- The ability to adapt to weather conditions
- Healing the environment

"Be the change that you wish to see in the world."
– Mahatma Gandhi

Regenerative Agriculture

2.5

Desertification through inappropriate land management, exacerbated by climate change, is one of the biggest threats facing humanity.

From Africa to India, China, Australia, and the Southern USA, deserts are growing at alarming rates – about 120,000 square kilometers annually. According to the United Nations, desertification is potentially the most threatening ecosystem change impacting livelihood of the poor.

Imagine an agricultural system that can feed everyone, works with natural cycles, builds soil and cares for the wellbeing of animals.

This is regenerative agriculture – farming with the intention to improve the land, building fertility through natural methods and planting diverse poly-cultures.

Animals farmed using these methods are healthier, live in a stress free natural environment and require substantially fewer inputs such as feed and medication.

According to the Rodale Institute, regenerative agriculture is a system of farming principles and practises that seeks to rehabilitate and enhance the entire ecosystem of the farm by placing a heavy premium on soil health with attention also paid to water management, fertiliser use, and more. It is a method of farming that improves the resources it uses, rather than destroying or depleting them.

Regenerative agriculture is a dynamic and holistic process where the main focus is to capture carbon in soil as well as in above ground biomass that counteract atmospheric carbon accumulation. Through a system of farming principles and technologies, this agriculture method does not degrade the land but improves it.

This method regenerates topsoil which leads to better water retention, better plant uptake and also supports bio-sequestration. Regenerative agriculture enables farmers to produce high quality food that leads to productive farms and healthy communities and thriving economies.

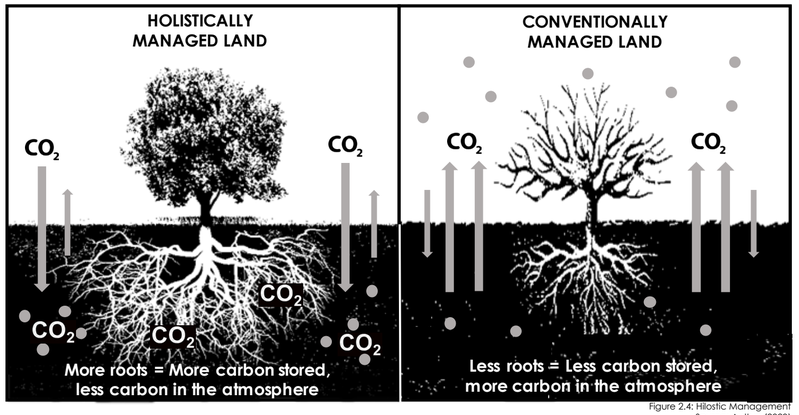


Figure 2.4: Hilistic Management
Source: Author (2020)

[core principles]

Regenerative agriculture is based on five core principles:
The first principle is to minimise or eliminate tillage. The second is to increase the biodiversity of plants to increase ecosystem functions above and below ground. The third and fourth principles are interwoven, as it comes down to having plants in the soil as long as possible where living roots will feed the soil biology by providing carbon and also protect the soil against water and wind erosion. The fifth is to integrate livestock, mainly to recycle nutrients through manure.

"We do not need to destroy natural systems to feed the world, regenerative agriculture is a broad field and is adaptable to any environment, on any scale. All that is needed is bringing natural cycles back to farming and understand the role of animals and time in land regeneration."
Unknown. (Unknown)

Place Theory

2.6

Proponents of regenerative development emphasise an ecological worldview. This worldview seeks to reconnect humans to nature and emphasises the use of natural rather than engineered processes. It was not until the 1970s that regenerative development gained momentum in the built environment.

The main aims of regenerative development are to revitalise, restore and renew materials, rather than to discard them, and to create and improve ecosystems. Regenerative development requires a design that is environmentally responsible.

Regenerative development is focused on the notion that a place can be healed and regenerated through human development.

Regenerative design and empowerment is an approach grounded in an understanding of 'Place' as a living system.

The principles of regenerative design include the following key ideas: a radical change for the better in terms of greater access to opportunity or resources; creation of a new sense of spirit and identity for the community; returning energy to the source by activating the periphery and providing infrastructure for empowerment for the given community. It can thus be seen as an architecture for the rebirth of a community.

People strive to create meaningful existential spaces where they can dwell. Norberg-Schulz has taken the concept of "dwelling" from Heidegger's essay "Building Dwelling Thinking" (1971) and has related it to the concept of "genius loci" as follows:

"Man dwells when he can orientate himself within and identify himself with an environment, or, in short when he experiences the environment as meaningful."

Dwelling therefore implies something more than 'shelter'. It implies that the spaces where life occurs are 'places', in the true sense of the word. A place is a space which has character. Since ancient times the 'genius loci', or 'spirit of place' has been recognised as the concrete reality man has to face and come to terms with in his daily life (Norberg-Schulz, 1980).

Concrete phenomena are perceived every day. These include tangible things such as people, animals or the stars, yet also consist of intangible phenomena such as emotions and feelings. These feelings are what make us, they are the content of mankind, the driving force of our existence.

The word "place", in terms of the teachings by Norberg-Shulz, is the totality made up of all the concrete phenomena, which appeal to the five senses. The forest consists of trees, and the town is made up of houses. "Landscape" is such a comprehensive phenomenon. In general we say that some phenomena form an "environment" to others, and a concrete term for environment is place.

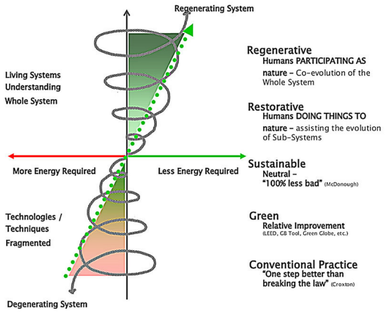


Figure 2.5: Trajectory of environmentally responsible design
Source: Reed (2007)

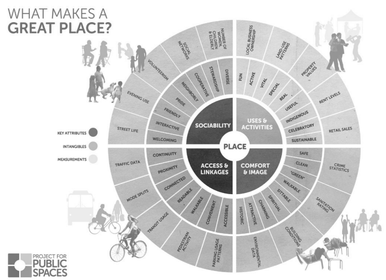


Figure 2.6: What makes a great place?
Source: Unknown (Unknown)

Norberg-Schulz proposed a set of landscape categories for natural places. These categories are generated by the basic relationship between the earth and the sky. In some regions, the sky may appear as the dominant factor in the landscape where in other places, the earth might be the primary presence.

These are important categories which may help us understand the genius loci of a place.

The three landscape archetypes of natural place, are: the Cosmic Landscape, Classical Landscape and the Romantic Landscape (Norberg-Schulz,1980).

"Being on earth implies to be under the sky. Although distant and intangible, it has concrete properties with a particular characterising function. The appearance of the sky is due to climate conditions, the quality of light and colour, and the presense of clouds.

Desert areas are characterised by a cloudless blue sky, emphasizing a feeling of infinite extension of the land. Therefore, to structurally orientate and identify one's self is to experience natural place within a natural place." (Norberg-Schulz, 1980)

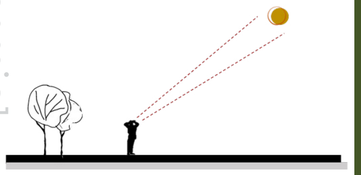
The cosmic landscape is characterised as an infinite monotonous extension of the earth below a cloudless sky. The landscape is dominated by the sunset, sunrise and the sky. The changing of atmospheric conditions contributes conclusively to the character of the environment in cosmic landscapes. The transitional affects of light is represented by a simple rhythm. This landscape has almost no sense of place or scale.

In a landscape where there is a variation in scale, a presence of "things" and the earth and its forces are most strongly felt; the earth is the dominant entity. In these landscapes, the sky has very little significance due to the fact that in forests, for example, the tree canopies block the connection towards the sky, the sky is hardly experienced as a total hemisphere. Behind every hilltop there is a new place. Therefore, there exists a romantic presence of that which you cannot see. These landscapes fall under Norberg-Schulz's archetype of a romantic landscape.

The classical landscape is neither characterised by monotony nor by multifariousness. Rather we find an intelligible composition of distinct elements: clearly defined hills and mountains. Whenever an equilibrium is reached between earth and sky in a landscape, the archetypal natural place can be categorised as a classical landscape.

The cosmic, romantic and classical landscapes are archetypes of natural place. Being generated by the basic relationships between earth and sky, they are relevant categories which may help us understand the "genius loci" and designs are in essence informed by these landscapes.

[cosmic]



[romantic]

[classical]

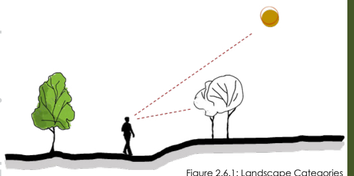


Figure 2.6.1: Landscape Categories
Source: Author (2020)

As for the "Imageability" of a place Kevin Lynch (1960) writes:

Since the emphasis here will be on the physical environment as the independent variable, this study will look for physical qualities which relate to the attributes of identity and structure in the mental image.

This leads to the definition of what might be called imageability; that quality in a physical object which gives it a high probability of evoking a strong image in any given observer. It is that shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment. It might also be called legibility, or perhaps visibility in a heightened sense.

Looking at Legibility, it helps shape identity when it comes to orientation and identification as represented/shown by "physical maps" and "mental maps" respectively (Lynch, 1960). Relationships of the landscape and settlement can be dealt with in three possible ways:

The first is adaptation, which the landscape can be learnt and adapted from. The landscape can be understood and replicated such as with the evolutional form of bio-mimicry.

The second is complementary; the landscape can be understood and the settlement can complement and add to what perceived nature is lacking.

The third is symbolic; the settlement can symbolise the understanding of landscape and translate that understanding into a meaningful built form. The very act of architecture is to understand this relationship and put forward a suitable creation of meaningful places.

2.6.1 & 2

[physical]

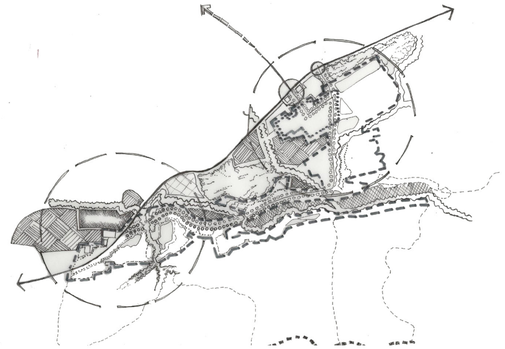


Figure 2.7: Interpretation of Zoar and Amalienstein's physical map
Source: Author (2020)

[mental]

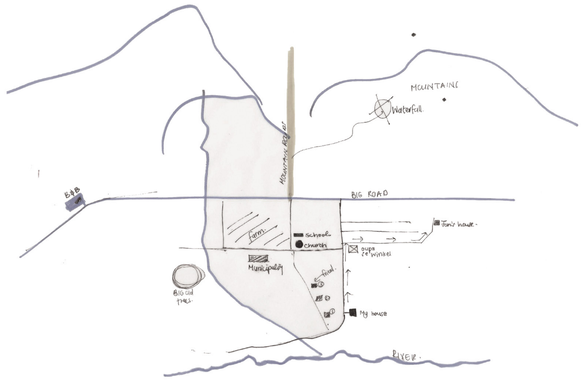


Figure 2.8: Interpretation of Zoar and Amalienstein's mental map
Source: Author (2020)

2.6.3

Being caught in the unknown is a terrifying experience. The elements set out by Kevin Lynch established as paths, edges, districts, nodes and landmarks, become the key tools to form legibility within the man-made place and construct their mental image of a settlement.

Figure 2.9: Five Physical Elements
Source: Sonia Jojic (2018)

The Elements of a settlement:

1. Paths. Paths are the channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, transit lines, canals, railroads. For many people, these are the predominant elements in their image. People observe the city while moving through it, and along these paths the other environmental elements are arranged and related. They arrange space and movement between spaces.

2. Nodes. Nodes are points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is traveling. They may be primarily junctions, places of a break in transportation, a crossing or convergence of paths, moments of shift from one structure to another. Or the nodes may be simply concentrations, which gain their importance from being the condensation of some use or physical character, as a street-corner hangout or an enclosed square. Some of these concentration nodes are the focus and epitome of a district, over which their influence radiates and of which they stand as a symbol. They may be called cores.

3.Landmarks. Landmarks are another type of point-reference, but in this case the observer does not enter within them, they are external. They are usually a rather simply defined physical object: building, sign, store, mountain or public art. Some landmarks are distant ones, typically seen from many angles and distances, over the tops of smaller elements, and used as radial references. Other landmarks are primarily local, being visible only in restricted localities and from certain approaches. These are the innumerable signs, store fronts, trees, doorknobs, and other urban detail, which fill in the image of most observers.

4. Edges. Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases, linear breaks in continuity: shores, railroad cuts, edges of development, walls. They are lateral references rather than coordinate axes. Such edges may be barriers, more or less penetrable, which close one region off from another; or they may be seams, lines along which two regions are related and joined together. These edge elements, although probably not as dominant as paths, are for many people important organising features, particularly in the role of holding together generalised areas, as in the outline of a city by water or wall.

5. Districts. Districts are the medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters "inside of," and which are recognisable as having some common, identifying character. Always identifiable from the inside, they are also used for exterior reference if visible from the outside. Most people structure their city to some extent in this way, with individual differences as to whether paths or districts are the dominant elements. It seems to depend not only upon the individual but also upon the given city.

PATHS

NODES

LANDMARKS

EDGES

DISTRICTS

Figure 2.10: Five Physical Elements of The Little Karoo
Source: Author (2020)

Linkage Theory

This theory is derived from the 'lines' connecting all forms of layers and forms of activity within the context of the city. In essence it is the design of a spatial datum which encompasses flow of movement, and organisational axis, or a building edge (Trancik, 1986).

The Linkage theory formed part of Roger Trancik's approach to 'urban spatial design' and this study provides an interesting lens through which to understand the architectural perspective in relation to establishing networks and community development opportunity through linkage systems.

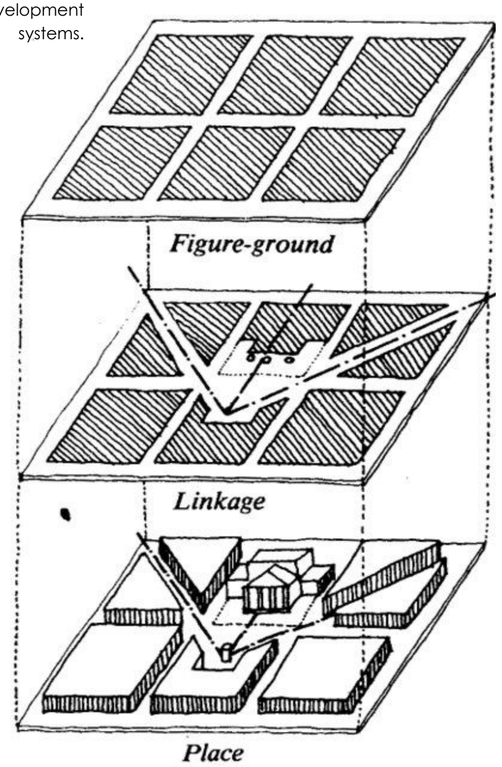


Figure 2.11: Urban space theories
Source: Trancik (1986)

Figure Ground Theory

Figure Ground Theory defines the interaction between the solid masses of buildings and the open spaces that surround them. This analysis that will be done in the next chapter is powerful in identifying structure, form, space and performance of the studied area as well as problems in its spatial order.

Fumihiko Maki's discourse 'Investigation into Collective Form' introduced three different types of spatial linkage when applied to architectural form which was examined by Trancik, and includes compositional form, mega-form, and group form (Figure 2.12).

Compositional form consists of buildings designed in isolation where linkage is implied rather than obvious and surrounding space is not as important as the building itself.

The second approach to linkage is the mega-form. This consists of a framework of integrated and interconnected space and elements where linkage is a physical attribute in the structure. Mega-form structures are similar to compositional form structures in the sense that physical context and human scale tends to be ignored (Trancik, 1986).

The third approach is called group form and is the result of incremental placement of elements and structure in a context that is particular to many historic towns. The group form sees linkage as being neither implied nor imposed but evolves as part of a naturally occurring process forming an integral part of the existing landscape (Trancik, 1986).

These approaches to linkage theory are important to note as it showcases how linkage becomes the controlling idea in the design of space and structure.

Understanding the essence of what the linkage theory stands for is to allow for considerations of the concept of linkage and movement both within the proposed architectural intervention and how it positions itself within the fabric of the town to be explored.

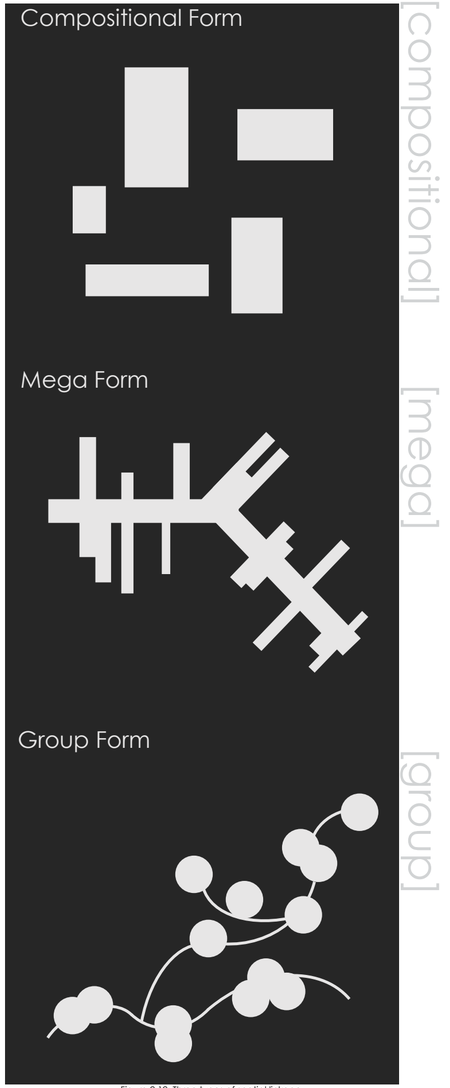


Figure 2.12: Three types of spatial linkage.
Source: Author (2020)

2.8 Context as Layers of Potential

The field describes a space of propagation of effects. It contains no matter or material points, rather functions, vectors and speeds. It describes local relations of difference within fields of celerity, transmission or careering points, in a word, what Minkowski called the world (Stanford Kwninter, 1986).

Architect and theorist, StanAllen (1985), describes a field condition as any formal or spatial matrix capable of unifying diverse elements while respecting the identity of each. Allen defines this field condition as one of loosely bound aggregates characterised by porosity and local interconnectivity, a bottom-up phenomena, defined not by overarching geometrical schemas but by intricate local connections.

Field Conditions, establishes the idea of an architecture defined not by built structure, but by the relationships of forms within an abstract field of dynamic conditions. In *Field Conditions*, Stan Allen iconoclastically proposes an architecture not concerned with tectonic, built form, but primarily dealing with the abstract concepts of space and spatial relationships within a hypothetical, dynamic field.

He looks to contemporary shifts in epistemological discourse, discovering novel ways of working to design more efficiently within the increasingly complex machinations and parameters of contemporary urban conditions.

Allen argues that the top-down field condition phenomena is insufficient for the negotiation of complex urban environments and that a bottom-up approach is vital for the future of architecture. Allen also argues that "interval, repetition, and seriality" are key concepts. Form matters, but not so much the forms of things as the form between things. Stan Allen's field conditions describe the state of perceptual but often invisible tension created by a system of physical spatial markers within the area where they are sited - or at times, well beyond.

Field conditions move from the one toward the many, from individuals to collectives, from object to fields. The term itself plays on a double meaning. Field conditions, here implies the acceptance of the real in all its messiness and unpredictability. Field conditions treat constraints as opportunities. Working with and not against the site, something new is produced by registering the complexity of the given.

Figure 2.15: Play Models
Source: Author (2020)

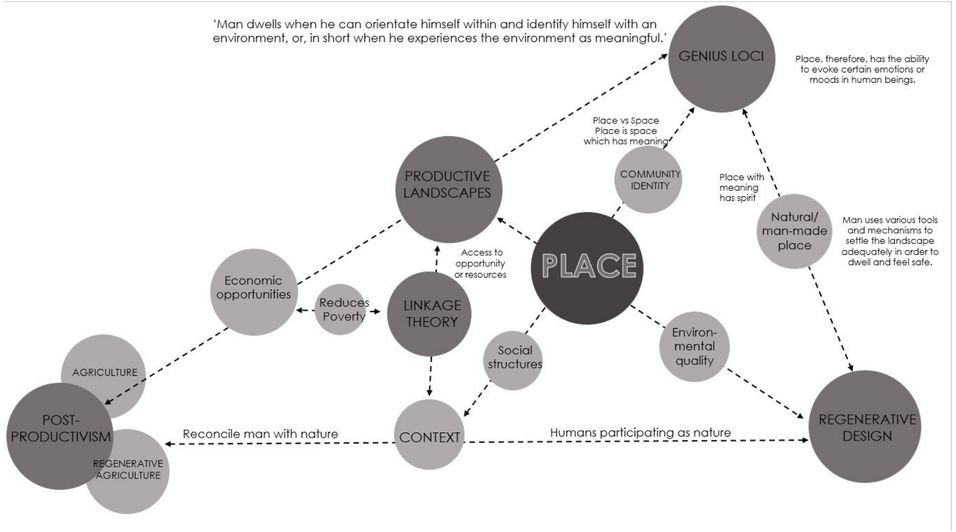


Figure 2.14: Diagram
Source: Author (2020)

2.9 Summation

Poverty and unemployment are crucial problems in the rural areas of South Africa. It is expected that the change from productivism to post-productivism can contribute to the solution of these problems.

Post-productivism stretches over several disciplinary domains involving environmental, economic, social and cultural aspects. Rural issues regarding land-use planning, rural development, social and economic change both on-farm as well as off-farm are all enfolded in this concept.

Through investigating productive landscapes it becomes clear that this strategy is the future to restore degraded landscaped to rebuilt hope for a better future. Productive landscapes should be thought of as an integration of production and landscape design. Moving away from cost ineffective economies, the vision is a diverse landscape based on the local character.

Productive landscapes goes hand in hand with regenerative architecture and agriculture, as it focuses on the practice of engaging the natural world as the medium for, and generator of the architecture.

It is recognised that character is the identification of a place. Place can be shown by 'physical maps' and 'mental maps' respectively. Through looking at figure-ground, linkage and place theories separately, understanding them as a part within a whole and then integrating them, they form clear structure to solids and voids, organising connections between the parts, and responding to the human needs and unique elements of the context.

Fumihiko Maki's discourse *Investigation into Collective Form* introduced three different types of spatial linkage when applied to architectural form. These approaches are important as they showcase how linkage becomes the controlling idea in the design of space and structure.

Analysing Stan Allen's *Field Conditions* and seeing the context as layers of potential and how he establishes the idea of an architecture defined, not by built structure, but by the relationships of forms within an abstract field of dynamic conditions will help open many design possibilities.

PHYSICAL CONTEXT

[Ch. 03]

3.1

Introduction:

[part]

General Information & Chapter Outline:

In order to choose an appropriate site that makes the most of the natural attributes of the area, it is important to first establish the nature of the physical context of the area. The following chapter deals with the framework of how and where an improved sustainable settlement can be established. This will be achieved through: an analytical and evaluative study; by developing an understanding of the four interrelated concepts which have significance for urban design and architecture; an analysis of the municipal area of Kannaland and the anatomy of the the two towns and precinct area. The four interrelated concepts are: Structure; Form; Space and Performance.

Structure refers to the ordering system of settlements; the underlying spatial relationships which form the anatomy or skeleton of a settlement setting up the logic to which human activities respond. Form refers to the three-dimensional manifestations of structure, as well as human and activities responses to it. Space which is also vitally important in its own right, is part of structure or order and it is fundamental in determining the spatial and social qualities of a settlement. Performance recognises that the spatial manifestations of urban settlements are, in the first instance, containers of life.

The evolution of design is an interrogation of the systems across the different scales. It is a cyclical, not linear, process. Macro scaling of the region gives an understanding of the location of the site, within the bigger context. Meso scaling of the sub-region gives an understanding of the site itself as a totality, while micro scaling of the precinct area focuses on a representative area of a number of blocks within the whole.

It is important to understand the nature and performance of the local area. This includes the logic of structure and activity responses to it. Here the emphasis shifts to evaluating performance. This is through developing a normative framework that applies to the local area uncovering spatial principles or relationships which contribute either positively or negatively to performance. To explore the issue of performance effectively, a site criteria was developed. This standard is important in the making of settlements at different scales. The site criteria were applied to systematically evaluate all scales associated with the site. Analysis of the area's anatomy established the spatial principles and insights which inform the achievements of the performance qualities positively and negatively.

By analysing and overlapping the natural systems (geology, soils, topography, climate, hydrology, flora and fauna), the cultural (heritage) landscapes, man-made and public structural components, it is possible to compile a Composite Constraints and Informants Map which represents the level of hierarchy of each issue that has influence on that scale. This map can be interpreted to identify positive and negative qualities, as well as opportunities and threats or in short "no-go", "tread-lightly", and "possible development" zones. From that the Urban Framework will be developed. It will then be brought over to the design chapter.

Site Criteria

3.2

In order to establish an appropriate site to facilitate the design of the Agave Padstal, it is important to understand the site requirements to determine the best and most appropriate location.

It is also of utmost importance to understand the needs and future development of the immediate surrounding area and communities to ensure a positive outcome for the proposed project.

Through the interrogation and understanding of the nature of the building type, dealt with in the previous chapter, the following site criteria would be applicable:

Finding a degenerated rural community with great potential where the agave crop can be the solution to regenerate the rural community.

Finding an area with a dry and hot climate where this non-indigenous plant can thrive without contaminating and cross-pollinating neighbouring farms. Non-arable land for the agave-based agroforestry will also be sought.

To design a 'padstal', the site must be located along a primary road which has the potential for a gateway condition forming an exchange node. As the site will accommodate a padstal the sightlines from Cape Route 62 and the Seweweekspoort Pass is very important.

The key component for making this 'padstal' viable will be community accessibility to increase opportunities for growth and jobs, and accessibility to the public especially tourists.

In order to form a strong sense of place the site must have a positive spatial impact on the aesthetic and performance of the settlement's urban framework with a connection to heritage and cultural components.

Figure 3.1: Lines
Source: Author (2020)

Figure 3.2: Site Section
Source: Author (2020)

Introduction to the Site

THE SITE

The proposed site is located in the Amalienstein Mission Complex and Farm of the settlements of Zoar and Amalienstein in the Kannaland municipal area of the Little Karoo in the Western Cape of South Africa.

It is difficult to talk about Zoar or Amalienstein separately, so interwoven are these two sister towns. They lie adjacent to each other on Route 62 at the entrance to one of the most astoundingly beautiful mountain passes in South Africa, namely the Seweweekspoort Pass.

What makes this area/site so perfect for agave-based agroforestry is that the mountains separate the valleys to help prevent contamination and cross-pollination from neighboring farms.

The plan below highlights how the Amalienstein Mission Complex and Farm fits into the bigger picture from a national down to a precinct level.

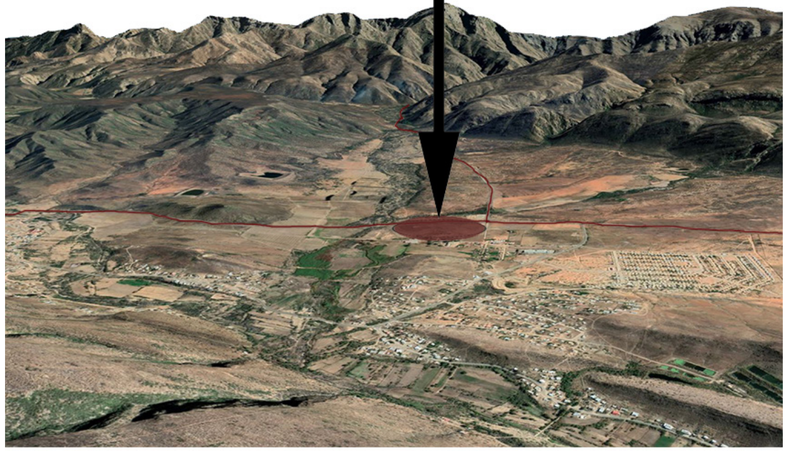


Figure 3.3: Aerial
Source: Author (2020)

Figure 3.4: Locality.
Source: Author (2020)

Background

3.3

[Photographs of the area]

Figure 3.5: Feeling of the place 1.
Source: Author (2020)

LITTLE KAROO AND CAPE ROUTE 62

The Little Karoo, in the Western Cape Province of South Africa is situated between the majestic mountains of the Cape Fold ranges; the Swartberg to the north, and the continuous Langeberg-Outeniqua range to the south. Geographically, it is a 290-km-long valley that is only 40–60 km wide. The Little Karoo stretches along the Cape Route 62, from Cape Town to Port Elizabeth.

The main towns are Montagu, Barrydale, Ladismith, Calitzdorp, Oudtshoorn and De Rust. This includes mission stations such as Zoar, Amalienstein, and Dysselsdorp.

The R62 is heavily promoted as a tourism destination in its own right providing a brand from which tourism operations and settlements can benefit. Route 62 is reputed to be the longest wine route in the world.

KANNALAND

The name Kannaland was derived from the Kanna plant (Salsola aphylla), Saltbush (English) or Gannabos (Afrikaans). Kannaland is situated in the western part of the Little Karoo and includes the towns of Ladismith, Calitzdorp, Zoar and Amalienstein,Van Wyksdorp and Hoeko.

The area was explored by European settlers from the late 17th century, who encountered Khoisan people living there. The semi-arid area was turned into a productive farming district. The magnificence of Kannaland is in its most spectacular rock formations and passes.

ZOAR AND AMALIENSTEIN

Zoar and Amalienstein lie adjacent to each other on Route 62, halfway between Ladismith and Calitzdorp, at the entrance to the Seweweekspoort Pass, in the Little Karoo. The two settlements have rich and interwoven histories.

Zoar, established in 1817, was the first of the South African Missionary Society's (SAMS) 'projects', when two farmers handed the farm Elandsfontein to the government for missionary work in 1817. After being set free, slaves settled at the mission station.

By 1838 Zoar had a church and huts forming a village which was inhabited by 300 to 400 Khoekhoen people. These locals 'colonised' by the missionaries were from the Attequa tribe, descendants of the Korana (a Quena/Khoi tribe). The inhabitants received an education, taught farming methods and religious instruction.

The Berlin Mission Society ran the mission station on behalf of SAMS, only to fall out over something vital enough that one of the injured parties established Amalienstein, just next door. The farm Amalienstein was bought by the Berlin Missionary Society in 1850 with the mission station being completed in 1853 in the building style of a century ago.

The mission stations were transferred to the Dutch Reformed Church during the First World War (1895). In 1937 Amalienstein was sold to JH Hofmeyer, with a 99-year lease agreement registered in favour of the Berlin Missionary Society in respect of the graveyard, school site, teacher's residence, church site and land adjoining the church site.

Hofmeyer sold the farm, Amalienstein, to the state in 1986 with the lease agreement included. It was to be held in trust for the community of Zoar and Amalienstein known today as the Amalienstein Mission Station.

Figure 3.6: Feeling of the place 2.
Source: Author (2020)

SEWEWEEKSPOORT PASS

The road from Amalienstein penetrates the Small Swartberg Mountains through the Seweweekspoort which is possibly one of the most spectacular of all the mountain ravines in the country.

The magnificent vertical rock-folds reflect the volcanic eruptions millions of years ago which formed the chain of Cape ripple-like mountains. The Poort is dominated on the western side by the Seweweekspoort Peak. At 2325m it is the highest mountain peak in the Western Cape.

During 1859 the authorities decided to build a pass through the Poort, which was completed in 1862. The historic pass, one of the oldest gravel passes in the country, is one of the last unspoiled nineteenth century road passes built by Italian prisoners at the Cape.

Today it is remains almost and is exactly as it was originally constructed. Once built, the Pass was regarded as one of the 'seven wonders' of the old Cape Colony.

There are several stories explaining the origin of the name Seweweekspoort. One is that it took the authorities seven weeks to catch a stock thief who fled into the mountains. Another legend is that that it took brandy smugglers seven weeks to return through the Poort from Beaufort West.

The ruins of the original tollhouse can be seen at the northern entrance to the Poort. The Protea aristata was rediscovered here in 1950's after it was believed that it had become extinct.

Little Karoo Route 62

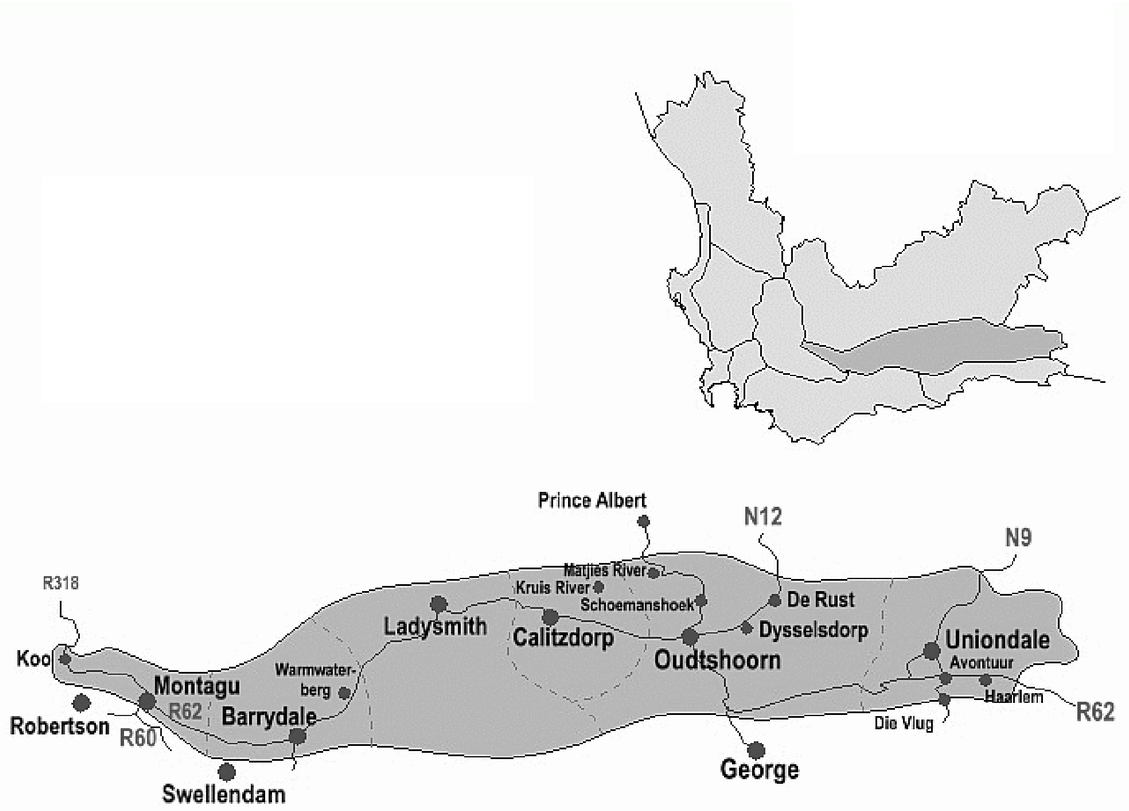


Figure 3.7: Little Karoo Route 62
Source: www.scapenotes.com (Unknown)

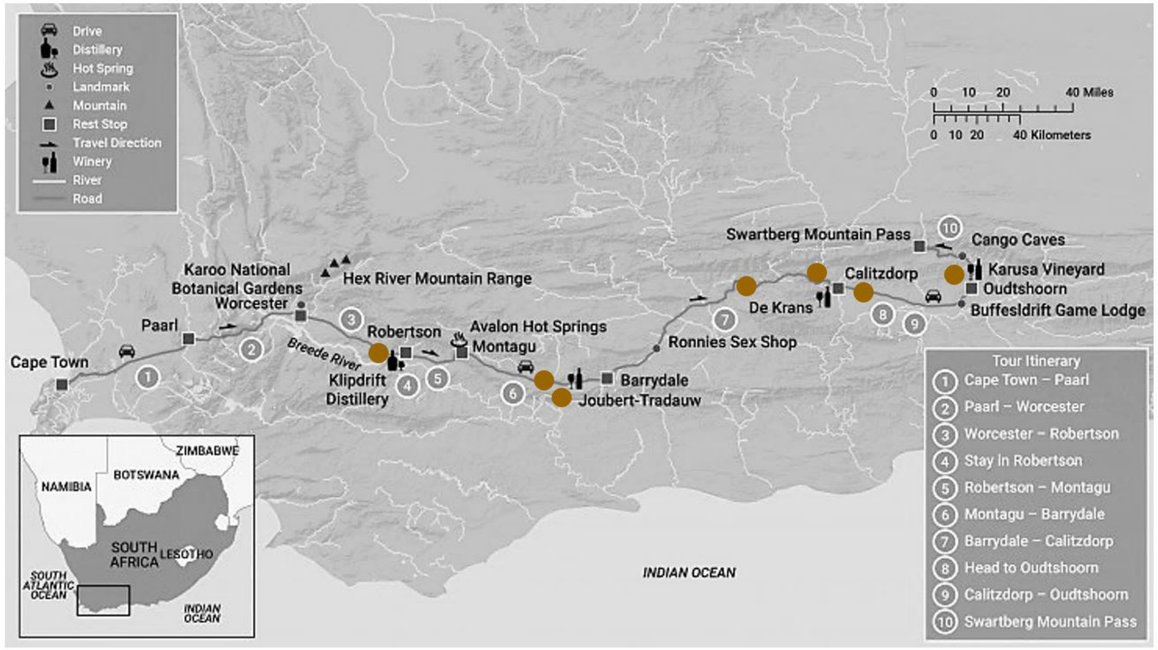


Figure 3.8: Little Karoo Route 62
Source: Author (2020)

3.4

Conceptual Framework Through Macro Scaling

[1:80 000]

MUNICIPAL AREA: KANNALAND
(excluding Van Wyksdorp)

For the initial phase of the analysis, macro scaling of the Kannaland area, the area around and between Ladismith and Calitzdorp, including Zoar and Amalienstein (excluding Van Wyksdorp), was done.

The focus here is on understanding the location of the site/study area within the bigger context. Macro scaling is a large scale involving general or overall structures or processes, rather than detail. Scaling at macro-level creates a permeable and rational network which is based on and derived from natural and manmade structuring elements included in the scaled area.

[natural environment]

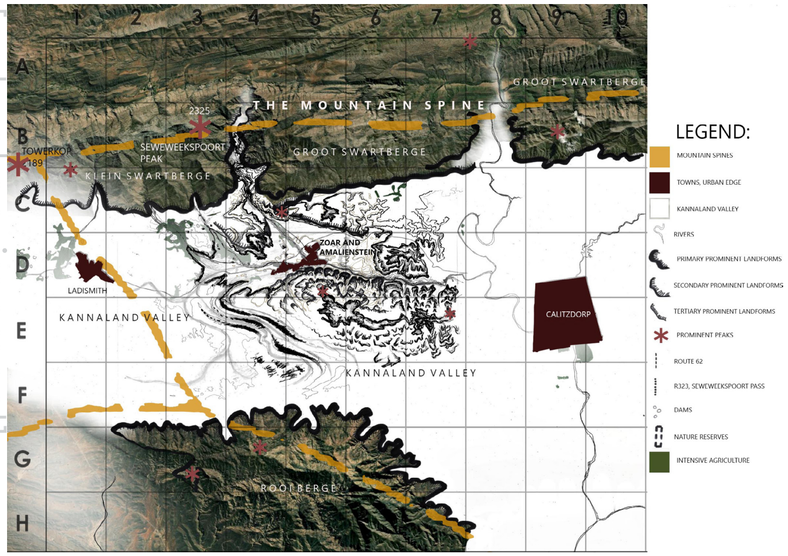


Figure 3.9: Landform Elements.
Source: Author (2020)

Kannaland's natural systems have a very distinct pattern. It comprises the pristine upper reaches of most rivers and their tributaries rising in the mountains, flowing across river valleys irrigating fertile river valleys.

The three distinct natural structuring elements of the natural systems found in Kannaland include:

Landform Elements

The most notable structuring element of Kannaland is the impressive backdrop of the west-east mountain spine to the north, the Cape Fold Mountain belt, comprising the Anysberg and the Great and Small Swartberge. To the south of Kannaland lies the Langeberg range. These mountains provide important bio-diversity conservation and wilderness tourism opportunities. The Seweweekspoort Peak, situated in the Small Swartberg mountain range, is at 2325m, the highest peak in the Western Cape and the highest mountain in the Cape Fold Belt. Another well-known landmark in the Swartberg is Towerkop (2 189m), north of Ladismith.

Valley Systems

The Little Karoo Valley, a 290 km long valley of only 40–60 km wide, is formed by two parallel Cape Fold Mountain ranges; the Swartberg to the north and the continuous Langeberg-Outeniqua range to the south. The Kannaland valley lies to the western strip of the Little Karoo valley, within 10–20 km from the foot of the Swartberg mountains.

Water Structure Systems

Most of the rivers rise in these mountain ranges. The Little Karoo is situated in the primary catchment of the Gouritz River. It is fed by three major tributaries of the Gouritz River namely the Touws-, Gamka- and Olifantsriver. The Groot River rises in the Anysberg and flows north-west to south-east before joining the Gouritz River to the south. Its tributaries supply the farming areas of Kannaland. Although Kannaland has a vast network of rivers, for the most part of the year, the rivers remain dry.

[natural environment]

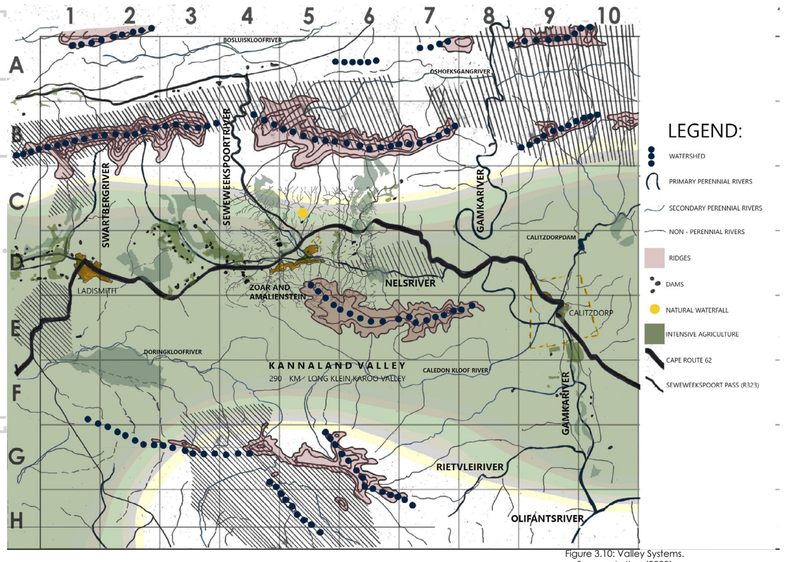


Figure 3.10: Valley Systems.
Source: Author (2020)

[built grain]

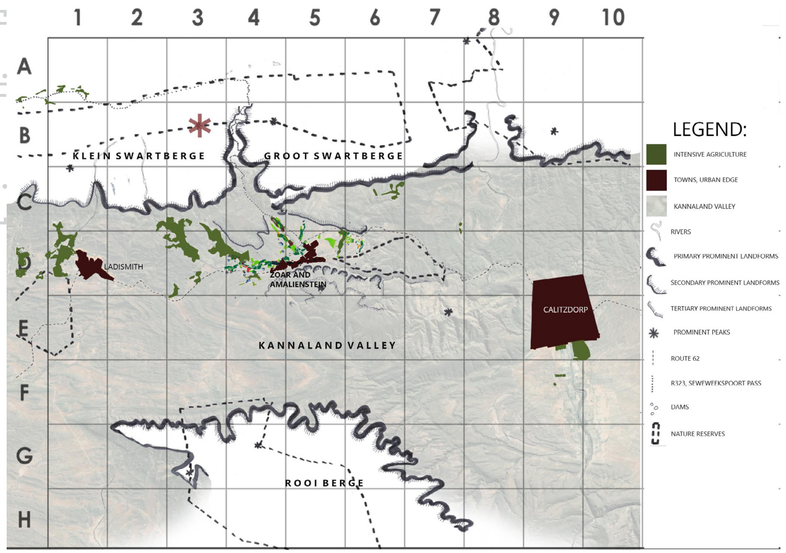


Figure 3.11: Towns and Agriculture.
Source: Author (2020)

[movement network]

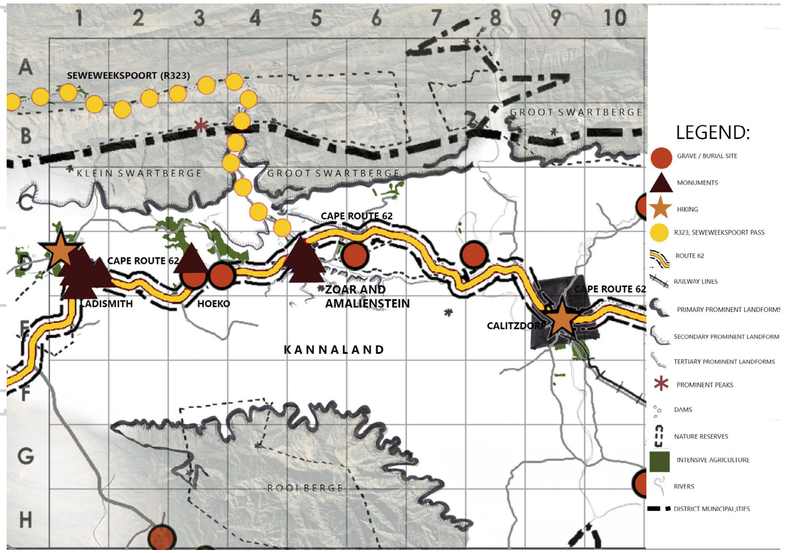


Figure 3.12: Movement Framework.
Source: Author (2020)

The main structuring elements described previously provide a framework on which important settlements and activities are located. These include:

Towns and Agriculture

Kannaland is situated in the western strip of the Little Karoo Valley and includes the towns of Ladismith, Calitzdorp, Zoar and Amalienstein, Van Wyksdorp and Hoeko.

This fertile valley, once a lake, has mainly alluvial soil. Kannaland is primarily an agricultural region, where the economy is strongly dependent on the very limited surface and ground water supplies for irrigated agriculture and range-fed livestock.

With intensive agriculture, the focus is mainly confined to the tributaries of the Groot River around Ladismith, and the Nels River through Zoar and Amalienstein and the Olifants and Gamka Rivers south of Calitzdorp. Agricultural crops are grown on either side of the rivers, up to around 1 km.

Movement Framework; Gateways and Heritage Connectedness

Although it enjoys relatively good road links to it, the Little Karoo as a whole is removed from the major N1 and N2 transport corridors. Kannaland's main connecting route is the R62, which runs through all the towns except Van Wyksdorp. Route 62 is modelled after the iconic US Route 66, made famous by the late, great Nat King Cole in the song of the mid-20th century.

Access to the N2 is rather indirect via Barrydale (R324) while access to the north to the N1 is extremely limited due to the mountain ranges. Ladismith, Zoar and Calitzdorp all straddle or abut this route. There are three major gateways – the Swartberg, Meiringspoort and Seweweekspoort Pass- linking the Great Karoo with the Little Karoo and the coast. The Seweweekspoort Pass is a world heritage site situated in Kannaland. Seweweekspoort is a rugged mountain ravine that lies just at the start of the Small Swartberge near Towerkop Nature Reserve. There is a strong heritage connection in Kannaland that includes the Lutheran mission complex and the church in Ladismith, the SA Mission society church in Zoar and the Berlin Mission Society church in Amalienstein.

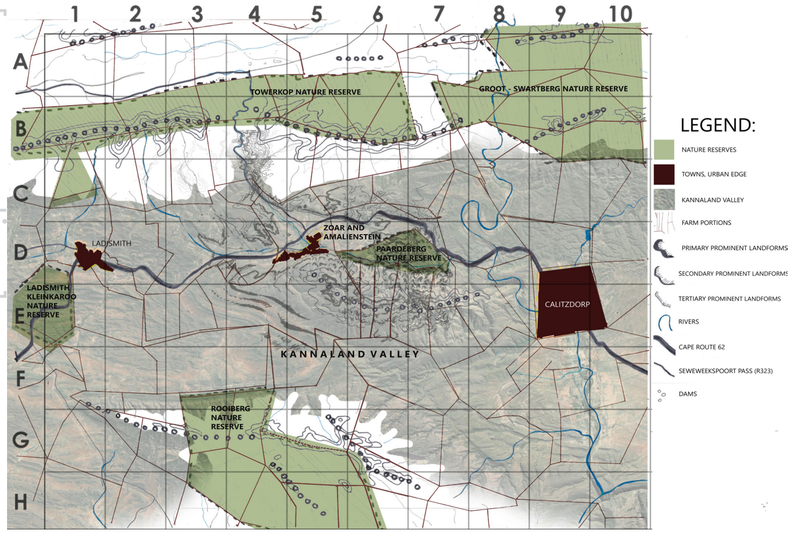


Figure 3.13: Nature Reserves.
Source: Author (2020)

Nature Reserves

There are six proclaimed nature reserves or conservation areas that are situated either partly or entirely in the Kannaland region. Nature reserves and conservation areas situated along the mountain ridgelines are more prone to veld fires than those in the valleys.

A nature reserve is a tract of land managed in order to preserve its flora, fauna and physical features.

A conservation area is an area of notable environmental and historical interest or importance which is protected by law against undesirable changes.

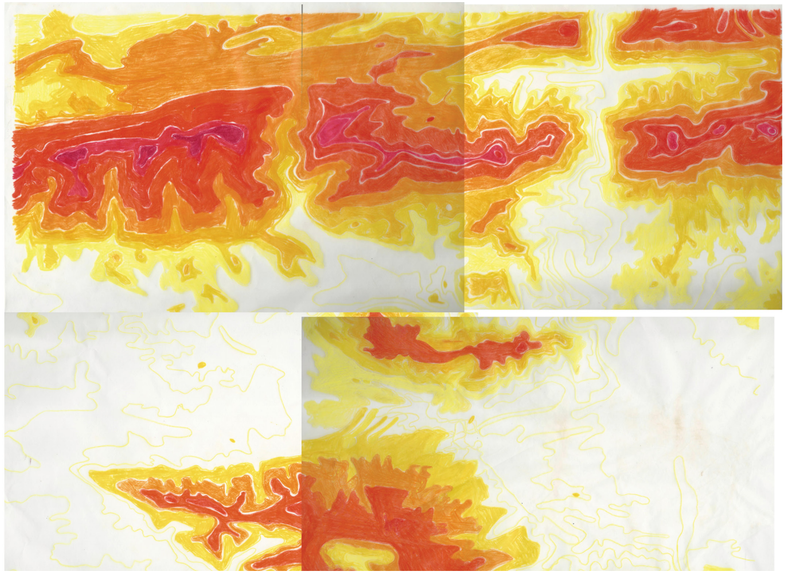
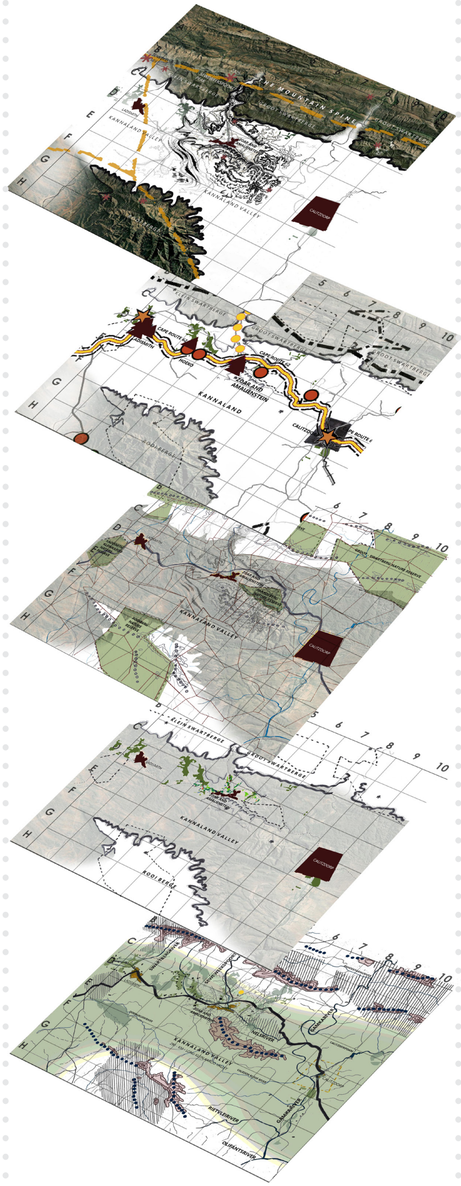


Figure 3.14: Layers of Height.
Source: Author (2020)

Sketch representing the magnificent scale of the Cape Fold Mountain Range



[axonometric]

Figure 3.15: Axo 1.
Source: Author (2020)

Analysis: The Kannaland Municipality

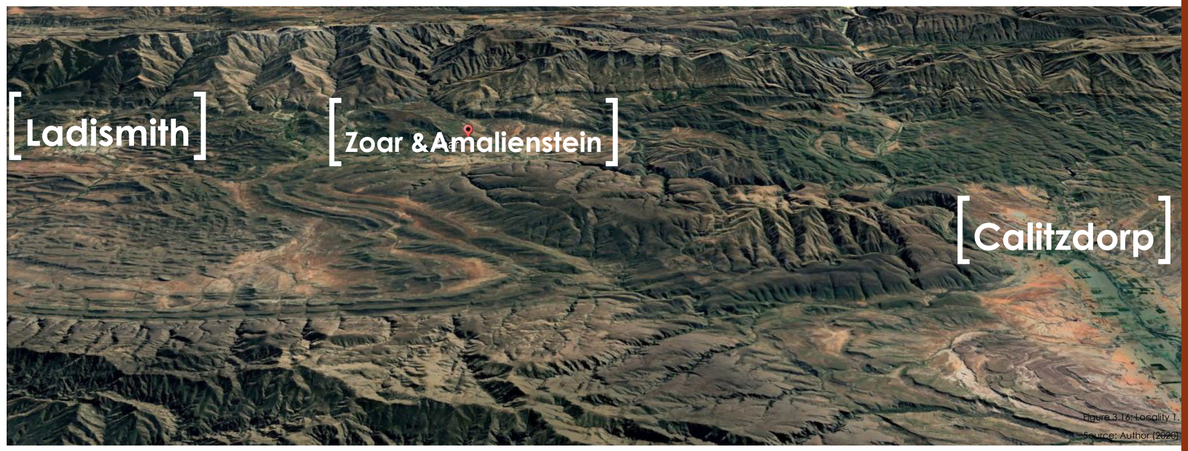


Figure 3.16: Locality 1.
Source: Author (2020)

The major elements of the natural systems of the Kannaland municipality area (excluding Van Wyksdorp) significant to the site, on macro scale, include the mountain ranges, valleys and the rivers.

Christian Norberg-Schulz (1984) distinguished between types of natural landscapes in his book *Genius Loci, Towards a Phenomenology of Architecture*. He describes these landscapes that are formed by the dramatic cliffs and escarpments of mountain ranges and steeply enclosed valleys in between, as Classical landscapes. For example, the mountain ranges such as those of the south western Cape from the Cedarberg, Hottentots Holland, through to the Swartberg and Outeniqua / Tsitsikamma.

The Little Karoo is an arid landscape where water is a scarce commodity and seen as a precious element around which life clusters. The valley and river system provide the lifeline to the site. It is evident that the site, at this scale, has a particular role to play in terms of the operation of the natural system as it is nestled in the valley near a river surrounded by lush, green farms. It is in contradiction to the arid Karoo vegetation surrounding it.

The natural and manmade characteristics, and the connection of the Seweweekspoort Pass to the Cape Route 62, make the site locally unique. Being one of the last unspoiled nineteenth century road passes in South Africa, the Seweweekspoort Pass has become a forgotten gem, filled with potential.

The development of the site would aid in highlighting the unique character of the surrounding area, strengthening it as a tourist destination as it forms a natural gateway to the site from the north and regenerate a wide variety of rural systems. The Swartberge and Rooiberge form the Gamka Valley which is also a natural gateway to the site from the west and east.

Just as the first civilisations came to life in the river valleys of Asia and Africa by providing opportunities to grow food, so did the settlements in the Little Karoo. Topography plays an important role and defines life throughout the Little Karoo. River valleys gave the early inhabitants of the area a reliable source of water for drinking and agriculture. The site was initially a farm called Elandsfontein, that was handed to the government for missionary work.

The major elements of the rural structure are mainly farms, towns, nature reserves and movement networks.

Concentrations of activity can be found in the towns of Kannaland. These towns, formerly farms, occur on the relatively flat terrain of the valley purposely established next to rivers mainly for agricultural purposes. Towns are linked by the R62, the main traffic way, that follows the spine of the valley for easy access.

Agricultural land is on the periphery of the towns. Smaller settlements like Zoar and Amalienstein have a completely irregular layout. These linear settlements are situated on hilly terrains whereas nature reserves are established mostly in mountainous areas.

The unique topography of the Little Karoo with its prominent mountain ranges forming the Little Karoo valley led to the spatial geometries of the rural structure of Kannaland.

The role of the site in terms of the metropolitan area is the gateway that it highlights between the R62 and the R323 (Seweweekspoort Pass).

3.5

Conceptual Framework Through Meso Scaling

THE TWO TOWNS: ZOAR AND AMALIENSTEIN

[1:20 000]

For the second phase of the analysis, meso scaling of the two towns, Zoar and Amalienstein, was done.

Meso scaling is an intermediate scale between macro- and microscale. Scaling at meso level gives a more detailed elaboration of the area/site and the focus is on the site itself as a totality. Meso scaling is a more proactive scaling that defines desirable directions,

[built grain]

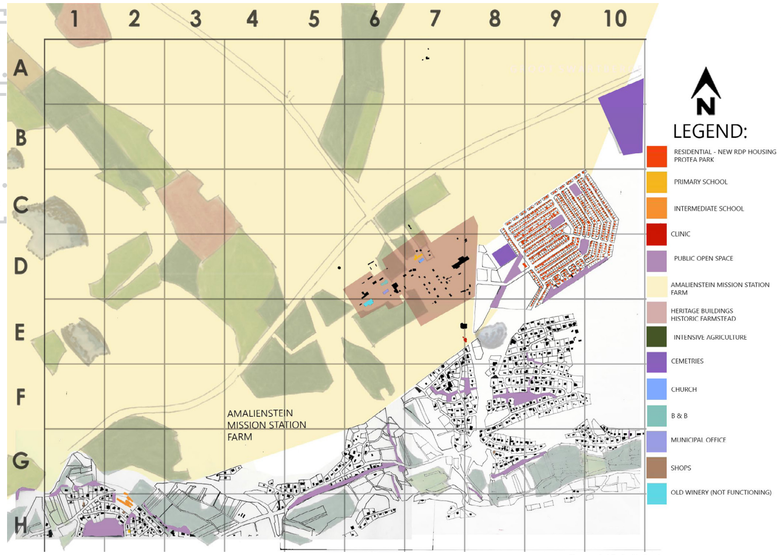


Figure 3.17: Built Grain.
Source: Author (2020)

[public space & facilities]

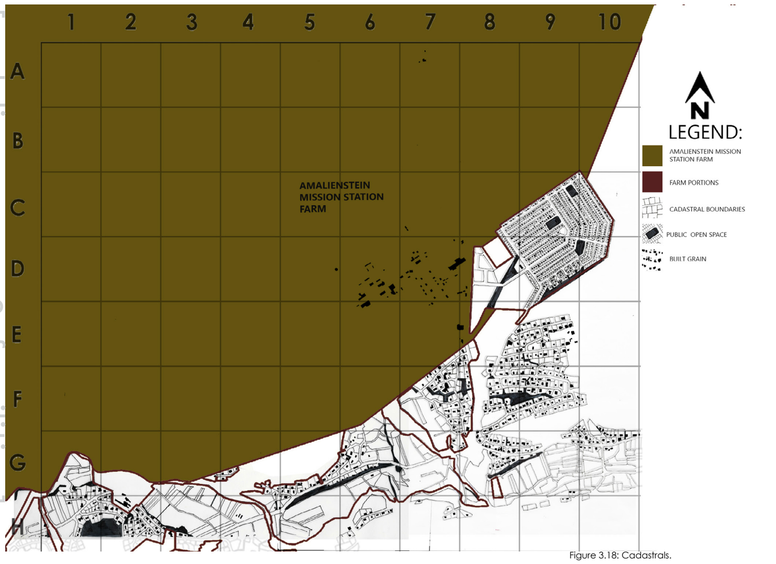


Figure 3.18: Cadastrals.
Source: Author (2020)

Built Grain / Activities

The settlements of Zoar and Amalienstein offer very limited commercial and retail opportunities. The majority of these are located along Main Street which winds its way between Zoar and Amaliensein following the river. The settlements offers facilities such as two schools, a crèche, two clinics, sports fields, bed and breakfast establishments, a municipal office and a few unused industrial structures. These are mostly scattered throughout the communities. Cemeteries were originally located outside the settlements.

This settlement pattern remains today and results in a unique layout that is tailored to the topography giving it considerable character. The settlements have mostly retained the fine grain of their built fabric from the 19th century, consisting of small detached and semi-detached buildings. Throughout the settlements, mostly unplanned public open spaces can be found, albeit they are underutilised. The more recent development, Protea Park, a low-income housing township in Amalienstein, is set apart from the initial settlements of Zoar and Amalienstein which means it are removed from activities. This township does not have the sensitive alignment of the earlier settlement. It lacks potential as an attraction offering little to enhance the character and identity of the settlement.

Cadastrals and Amalienstein Mission Station

The layout of the settlements of Zoar and Amalienstein do not reflect any formal town planning but rather a historic development of unplanned growth where initial developments were limited by physical elements such as steep inclines, courses of rivers, presence of agricultural land or nature areas and rocky soil.

A linear riverside settlement pattern emerged. This was due to the primary source of livelihood being farming. This took place on garden plots irrigated by the Nels River. Houses were built on the high ground freeing up arable land in the flood plain while protecting the residents from flooding.

The more recent development, Protea Park, a low-income housing township in Amalienstein, comprises a textbook layout as conventional civil engineering standards were followed to reticulate a standard township for the most efficient delivery of reticulated services.

Many historic buildings have remained intact, for example, the Zoar Mission Church, the Amalienstein Church and Mission Complex/Farm.

[natural environment]

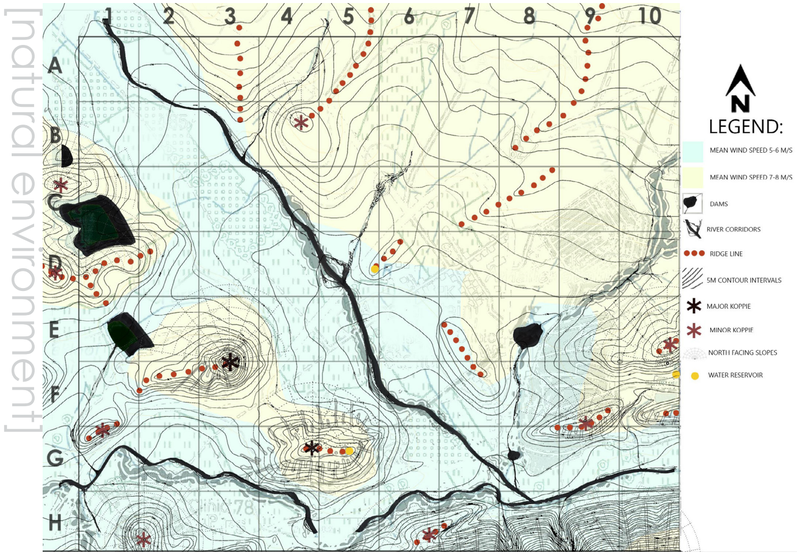


Figure 3.19: Hydrological Systems and Climate.
Source: Author (2020)

[land use]

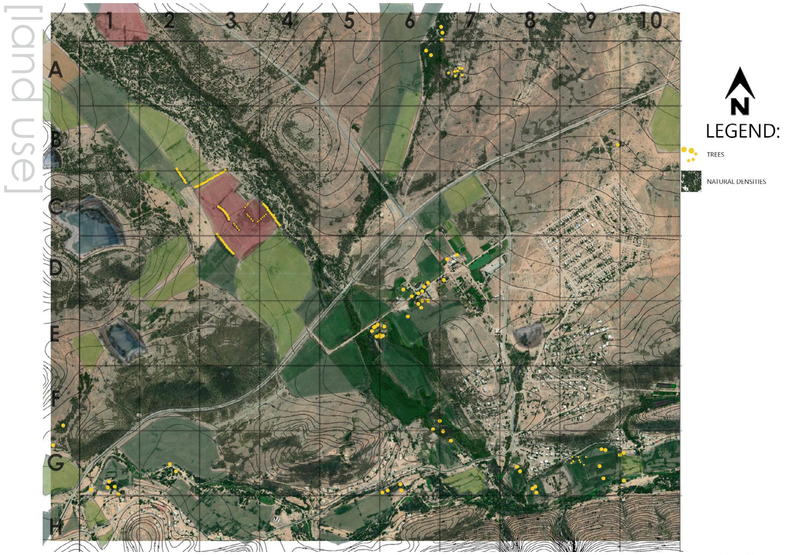


Figure 3.20: Agriculture and Natural Densities.
Source: Author (2020)

Hydrological Systems and Climate

The Nels River supplies water for farming for the Zoar and Amalienstein settlements, but the excessive extraction of water, for irrigation higher up in the river, has degraded the riverine ecosystem.

The two settlements receive their domestic water from the Tierkloof Dam located in the Seweweekspoort Pass. A water pipeline and booster pump station transfer the water to the settlements. A wastewater treatment work is located opposite the township of Zoar, next to the R65 district road, from where purified water is distributed to various reservoirs. Unfortunately, there are huge water losses along the supply pipeline to the reservoirs due to illegal water connections. The alternative source of water for these two settlements is the Jongensland Dam on the farm Amalienstein.

The climate in Kannaland is known for its hot, dry summer days. The average annual rainfall is about 270 mm, with rainfall occurring throughout the year. The average midday temperatures range from 16.6°C in July to 29.6°C in January with the mercury dropping to 3.2°C on winter nights.

Agriculture and Natural Densities

Zoar and Amalienstein are essentially dispersed agricultural settlements with large areas of cultivated land located along the Nels River. Although set in a fairly arid landscape and climate, the settlements have the feeling of an oasis in a desert due to the garden plots that are planted and irrigated from the Nels River. The Amalienstein Mission Complex, which includes the Amalienstein Farm, is a large section of land alongside the R62 which is proclaimed a Rural Area in terms of the Rural Areas Act (Act 9 of 1987). This is a so-called "coloured rural area" where the land is held on a communal basis by the residents in the area. The majority of agricultural land of the Amalienstein Farm, north of the R62, has lain dormant for quite a few years due to water shortages for crop irrigation.

Tightly composed sets of natural elements define settlements limits, consisting of the mountains, a river valley with vegetation and the Nels River. The non-perennial river systems, although dry on the surface, have an influx of subterranean water networks, thus making it possible for a multitude of plants to exist in the dry climate. These spaces are the natural "green" spaces within the context of Zoar and Amalienstein. Structural vegetation is mostly found within the historic area of the Amalienstein Mission Complex.

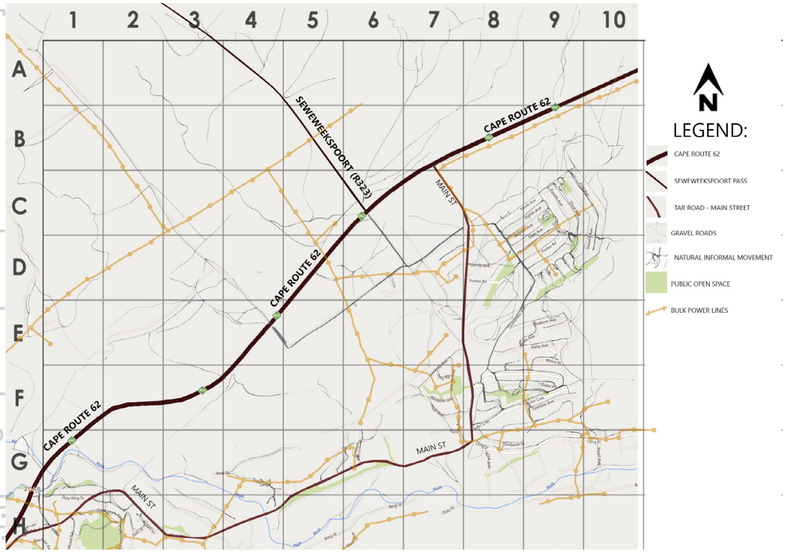


Figure 3.21: Agriculture and Natural Densities.Movement Networks, Connectedness, Nodes and Bulk Powerlines.

Source: Author (2020)

Movement Networks, Connectedness, Nodes and Bulk Powerlines

The settlements of Zoar and Amalienstein which are only accessable from the Cape Route 62, are located between Ladismith and Calitzdorp. Main Street, the only tarred road, is the primary movement route of the settlements. This road runs almost parallel to the R62 entering and exiting from the R62.

Main Street winds its way between garden plots and houses of Zoar and Amalienstein, following the river as a long crescent enclosed by hills and mountains. The internal street layouts of these two settlements are all unplanned gravel roads. These roads form the informal movement structure of the settlements.

They offer facilities such as schools, a crèche, clinic and sports fields which are accessible only by the internal gravel roads. Minimum exposure is given to the historical core of the settlements, as these areas are also serviced by the informal movement structure.

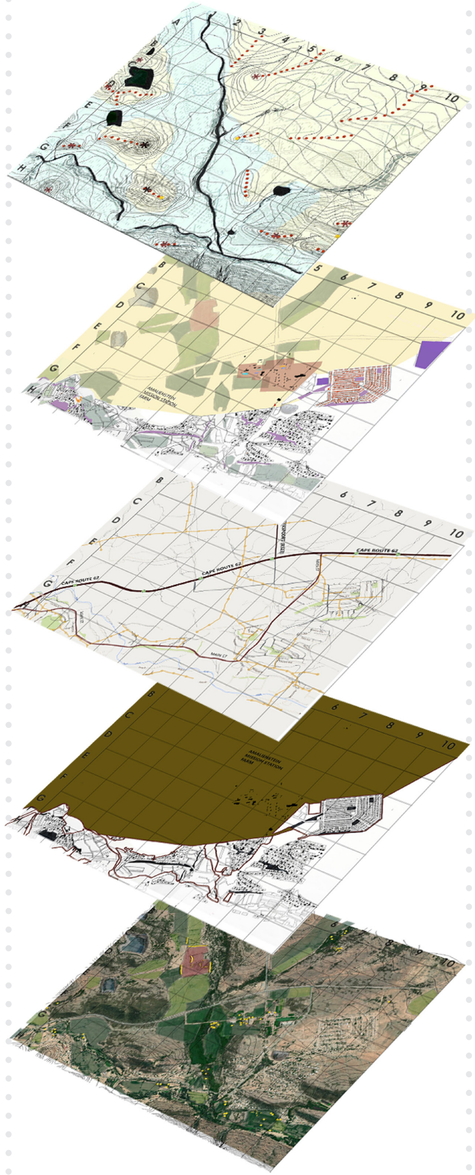
The only planned street layout is that of the low cost housing scheme, Protea Park. However these streets are also not tarred or paved. There are three important and significant nodal intersections influencing the settlements.

Two of these intersections are where Hoof Street connects to the R62 and the third is Amalienstein's strategic position as the termination of Seweweekspoort Pass at the R62 and the R363 intersection.

Figure 3.22: Aerial Photograph

Source: Author (2020)

Aerial Photograph of the stettlement of Zoar and Amalienstein



[axonometric]

Figure 3.23: Axo 2.
Source: Author (2020)

Analysis: The Two Towns

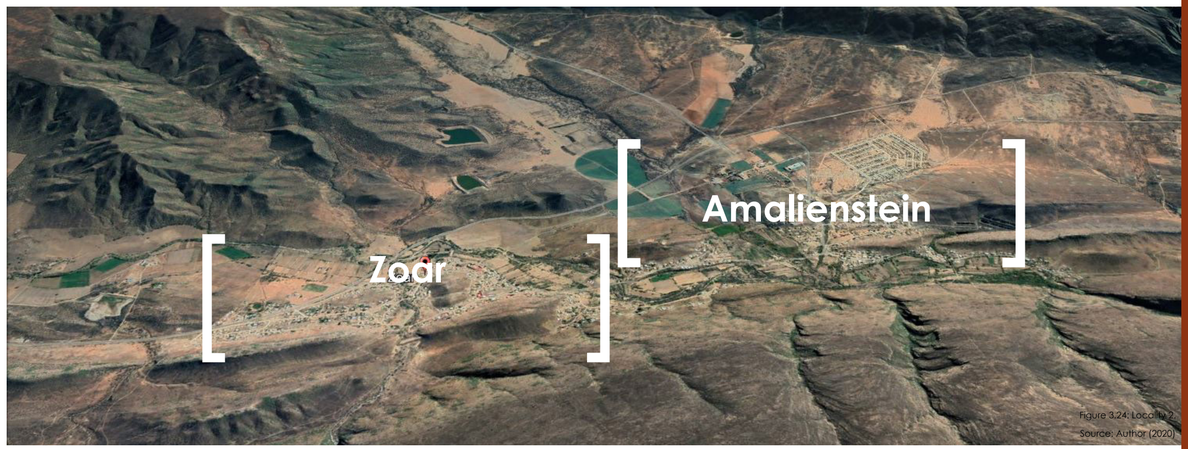


Figure 3.24: Locality 2.
Source: Author (2020)

The rural settlements of Zoar and Amalienstein are generally of small scale, yet they are individually unique in historical character and form. They portray special intrinsic values to the rural environment such as their distinctive architectural and landscape, articulation of a sense of place, demonstration of community spirit and preservation of their founding nature.

The landscape of Zoar and Amalienstein and surrounds is largely defined by its topographical relief. Landform defines all elements of nature and gives the area its unique characteristics. Natural systems, especially valleys, contribute to a large make-up of the habitable surfaces of these settlements.

In the landscape which favours accessibility and permanent occupancy, the settlements of Zoar and Amalienstein have assumed a linear form of urban development in response to the strong elements of linearity, the valley and river.

Some, but not all infrastructure practices from the area are in line with the concept of "sustainable development". The supply of drinking water as well as irrigation water is currently a key factor that undermines the concept of sustainable development. Water is the backbone of economic development in rural agriculture settlements. Other infrastructure practices from the area that are not in line with the concept of "sustainable development" include work opportunities and access and connection to essential and social services. Here people cannot use different transport modes to easily access economic opportunities, education institutions, health facilities and places of recreation.

The configuration of the major elements of urban structure was caused by the physical elements, for example steep inclines, river courses and presence of agricultural land. A linear riverside settlement pattern emerged as the primary source of livelihood with farming on garden plots irrigated by the Nels River. Houses were built on the high ground freeing up the arable land in the flood plain and protecting residents from flooding. The main movement network also developed alongside the river.

In the settlements of Zoar and Amalienstein the pattern of land-use responses is mainly one of an intertwined residential and agricultural nature as they originated as self-sustained agriculture communities. Activities are structured and ordered by the Nels River and Main Street, as well as the informal movement networks.

As Zoar and Amalienstein are rural settlements, the identifiable social patterns are limited to the social structures available. For example sport fields, clinics, schools, churches and shops. Except for agricultural activities, these social activities are the main activity pattern.

Broadly, the area accommodates life satisfactorily as it is located in a fertile valley alongside a river and has a dry, hot climate. Agriculture functions well in the area, as it has for many years. However the scarcity of water does play a critical role in farming success, but with better and wiser farming techniques and crops, agriculture can be a success.

Farmers trying to make a living from agricultural crops and methods that cannot survive water scarcity are struggling to survive. The people on the site are poorly supported by facilities and activities outside thearea, as it is isolated and removed from larger towns in the municipal area.

Composite Constraints & Informants

[1:20 000] 3.6

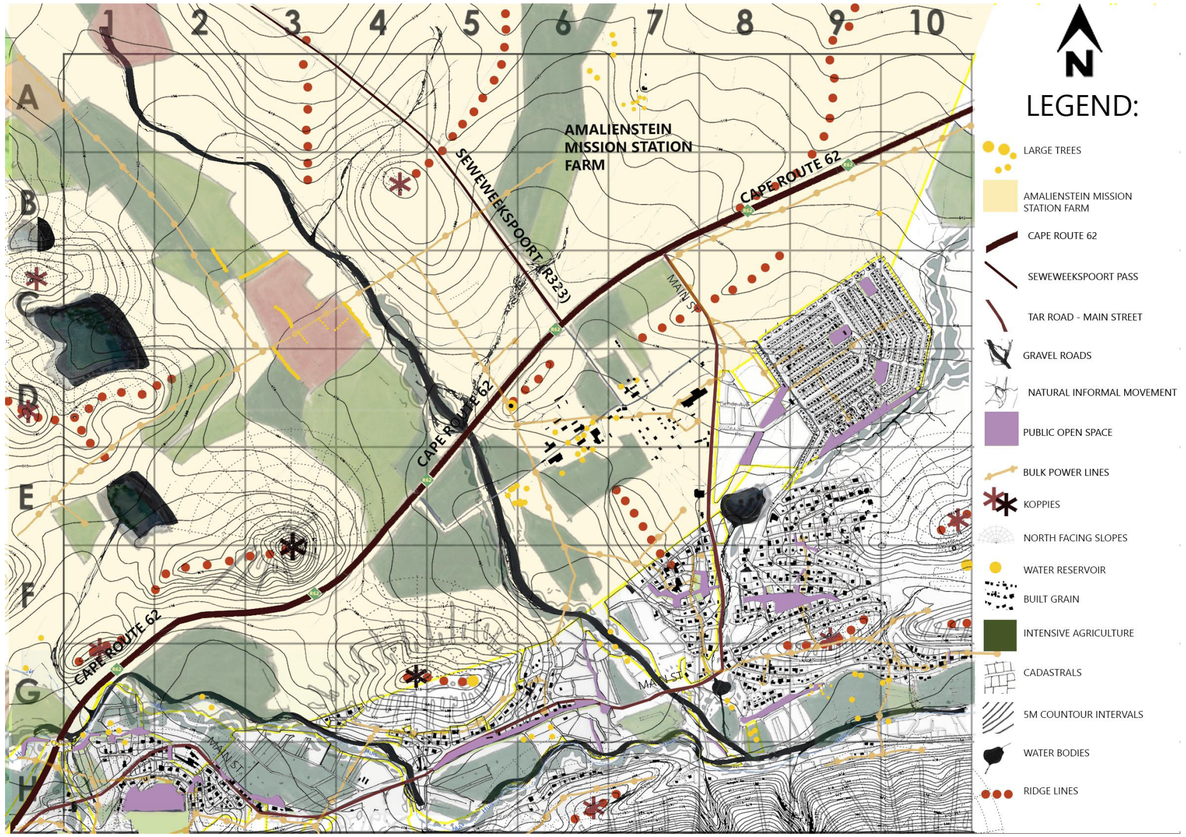


Figure 3.25: Composite Constraints and Informants.
Source: Author (2020)

Dominant Spatial Problems

[1:20 000] 3.7

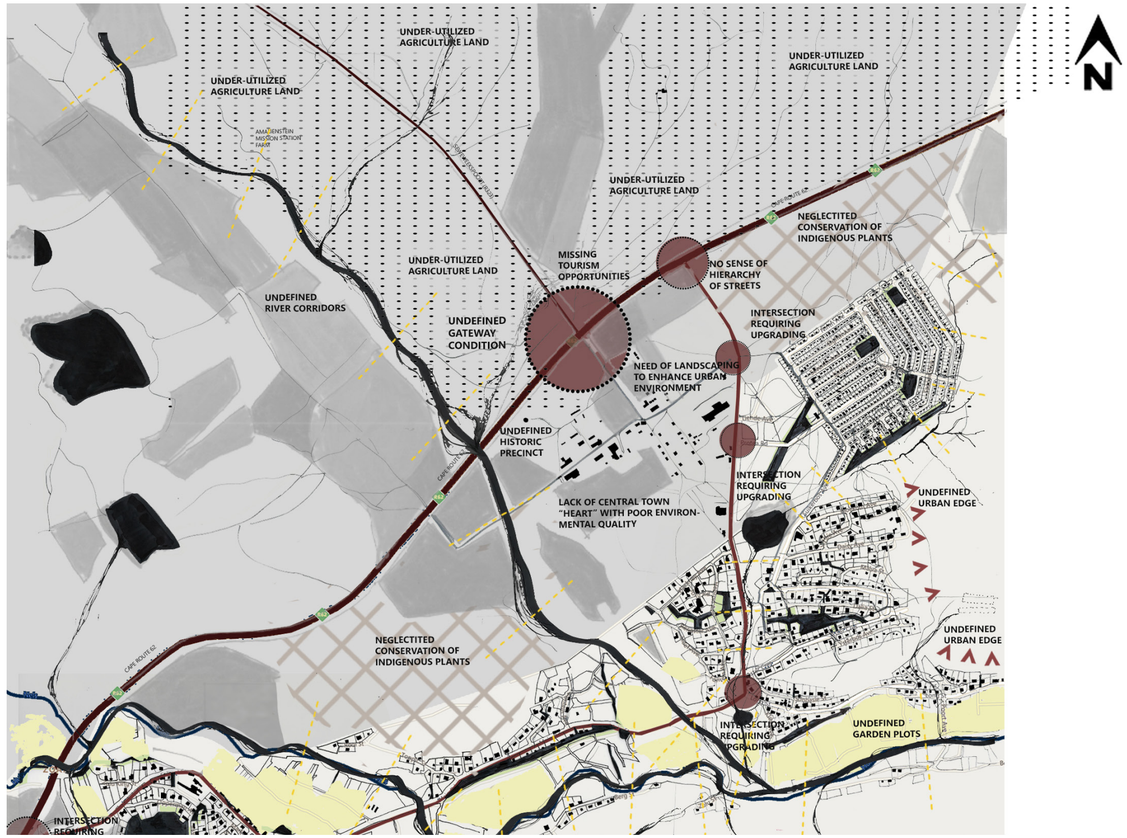


Figure 3.26: Dominant Spatial Problems.
Source: Author (2020)

3.8

Conceptual Framework Through Micro Scaling

PRECINCT AREA: AMALIENSTEIN MISSION COMPLEX

[1:2000]

For the final phase of the analysis, micro scaling of the precinct area, Amalienstein Mission Complex, was done.

Micro scaling is the smallest scale used in this study. Scaling at micro level places the focus on a representative area of a number of blocks within the whole.

[built grain]

[natural environment]

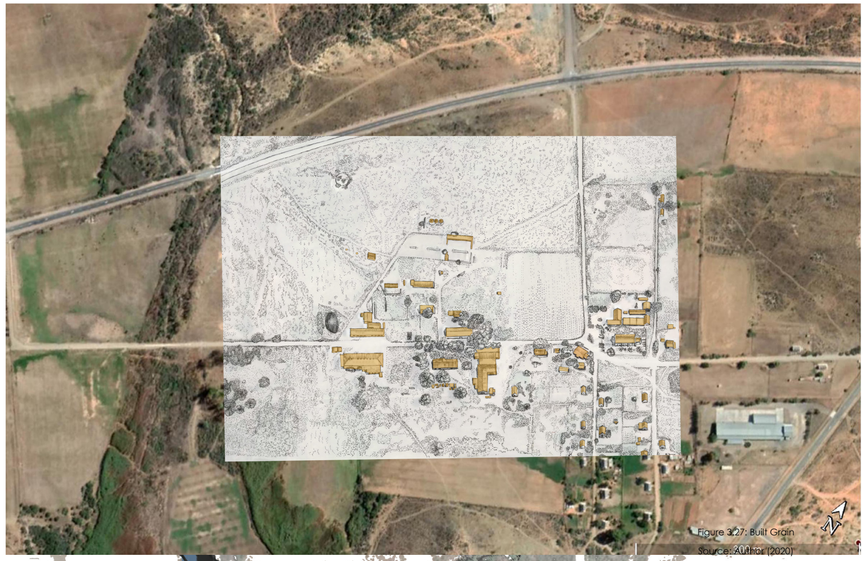


Figure 3.27: Built Grain
Source: Author (2020)

Figure 3.28: Natural Environment.
Source: Author (2020)

Built Grain / Activities

The Amalienstein Mission Complex and Farm are situated approximately three kilometers to the east of Zoar. This is as a relatively isolated location away from main rivers at the end of the Seweweekspoort Pass. This complex consists of a 7 000 ha farm which straddles the R62. The historic cores are located to the south of the R62 with the majority of agricultural land to the north of the R62.

[movement network]

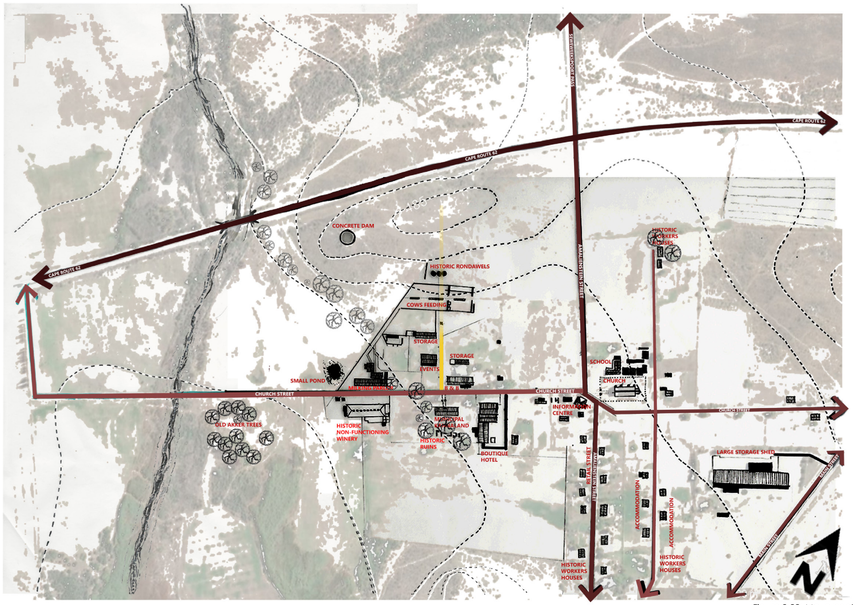


Figure 3.29: Movement.
Source: Author (2020)

Figure 3.30: Aerial Photograph.
Source: Author (2020)

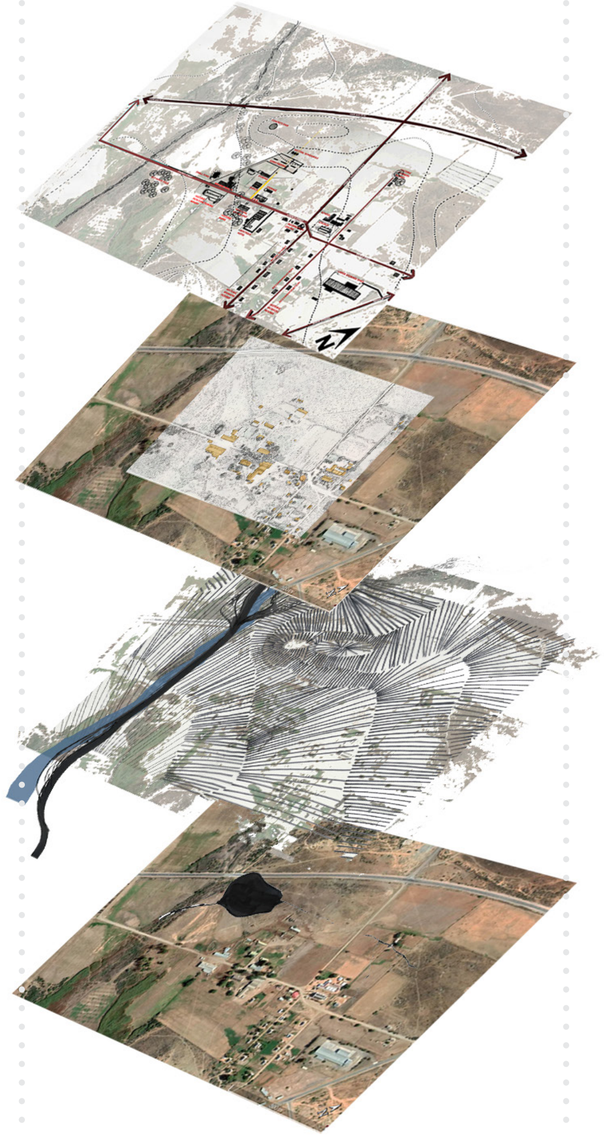
Movement Framework and Connectedness

The historic core of the farm includes the homestead or primary dwelling (farmhouse), farmworker houses, outbuildings comprising of an old winery, a functioning dairy, landscape elements and spaces. There is also the historic core of the mission complex including the Evangelical Lutheran Churchwith its two bell-towers and ring-wall located to the east of the homestead.

There is a definite sense of the historical essence to the complex. The layout integrity of this complex has remained intact reflecting its historic origins of a close relationship with productive agricultural land. It retained the fine grain of its built fabric from the 19th century as can be seen in the historic buildings. Other historic buildings and structures include the graveyard, the school and teacher's residence. Structural vegetation is mostly found within the historic farmstead core.

There is, however, a continual danger of this important economic and urban heritage resource being undermined by indiscriminate building and renovations. It is still possible to detect the original building quality in certain older dwellings but in places the urban fabric has partially lost much of historic quality as renovations over the years were undertaken with whatever building materials were cost effective at the time.

Aerial Photograph



[axonometric]

Figure 3.31: Axo 3.
Source: Author (2020)

ANAYSIS: PRECINCT AREA

Figure 3.32: Locality 3.
Source: Author (2020)

In the precinct area of the Amalienstein Mission Complex and Farm, the historic homestead is the centre of activities and axis lines. Therefore it organises and structures the precinct area.

There is quite a variety of activity accommodated in this complex including a small dairy, bed and breakfast establishment, municipal office, an information centre, a church and creche.

House types accommodated are the main farmhouse, some farmworker houses and the teacher's house. All are heritage buildings.

There is really no significant choice of lifestyle in this area as it is mainly an agricultural lifestyle. People are either small-scale farmers, seasonal farmworkers, or they work on the dairy farm. Unfortunately, the Amalienstein Mission Complex and Farm currently runs at a substantial loss. This is due to the inaccessibility of the historical precinct and water scarcity which plays a detrimental role in the operation of this area especially the farming component.

There is currently no real hierarchy of public and semi-public space as the pattern of the urban fabric has no degree of public/privateness. Spaces are relatively positive, but are not used to their full potential.

A good degree of privacy is attributed to the builtgrain which is very dispersed. It is typical of a South African farmstead typology. For example, Groot Constantia.

The infrastructure is almost non-existent and with the new proposed urban framework it would be substantially improved. Lack of infrastructure in and around the farmstead limits the variety of vehicles that could experience the space. Urban development was structured away from the main riverbanks, south of the R62, thus freeing up agricultural land on the riverbanks to the north of the R62.

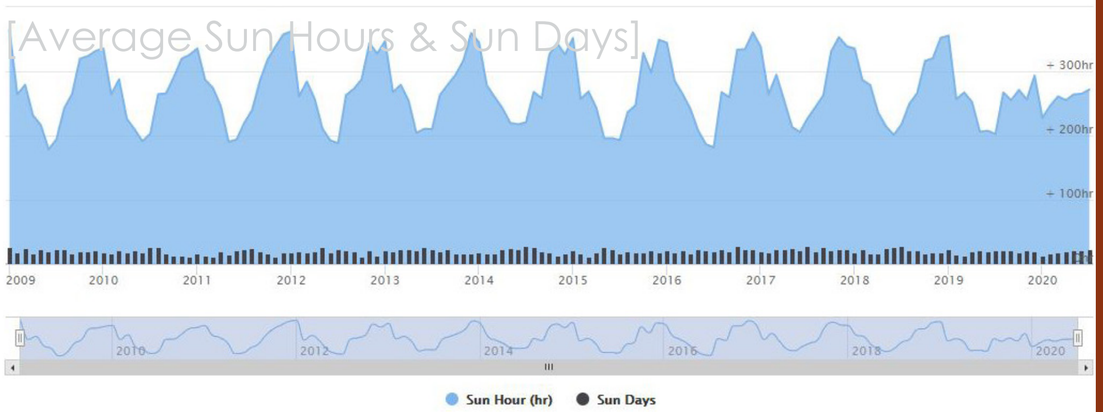
Micro-climate is the climate of a small, restricted area that is different from the climate around it. The slower wind speed in the flatter, lower areas affect the temperature and humidity because wind tends to remove heat and water vapor. The higher areas would be cooler, and the lower areas would be warmer.

The precinct area has a range from high to low points, the climate differs from valleys to small ridge lines.

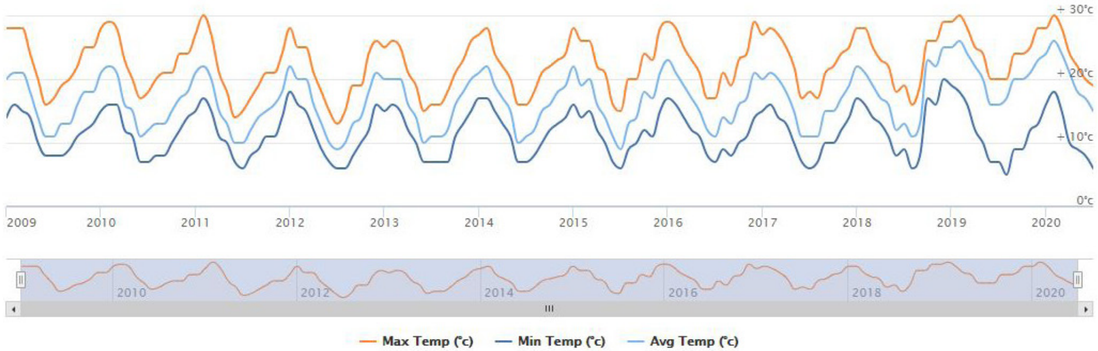
The homestead is surrounded by big shade trees making it cooler on average, it is protected from the direct heat of the Karoo sun.

3.9 Climatic Conditions of Zoar & Amalienstein

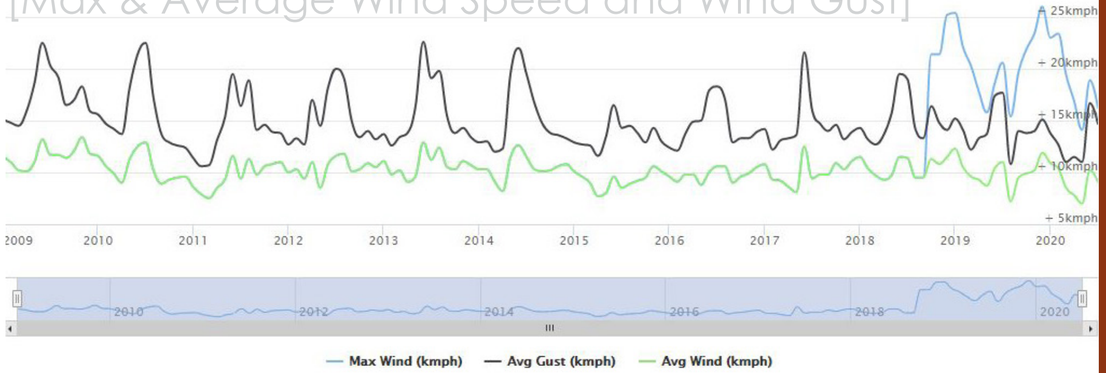
[Average Sun Hours & Sun Days]



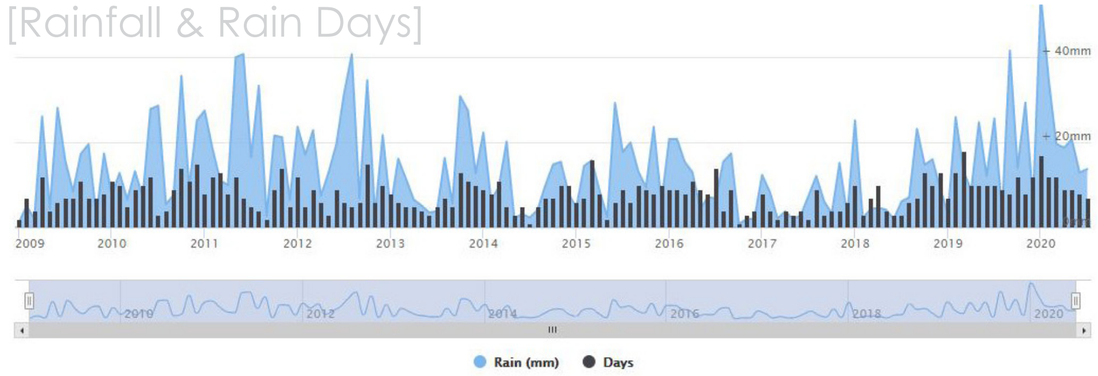
[Max, Min & Average Temperature]



[Max & Average Wind Speed and Wind Gust]



[Rainfall & Rain Days]



[Cloud & Humidity]

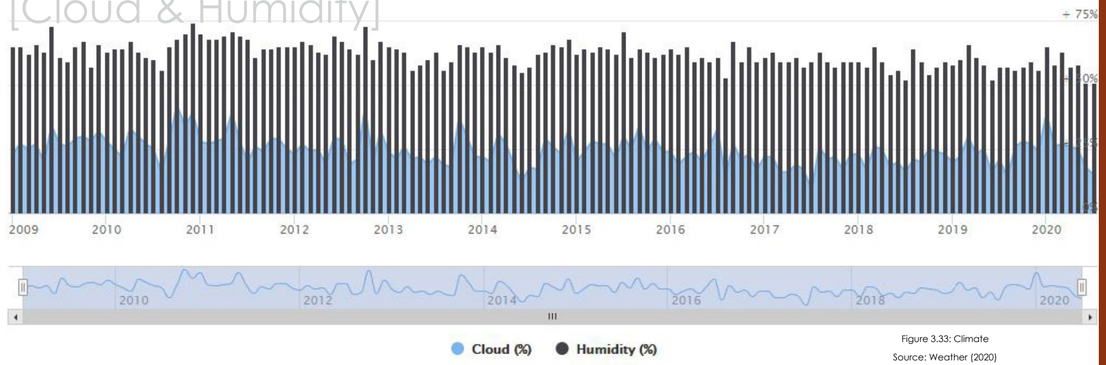


Figure 3.33: Climate
Source: Weather (2020)

Panoramic Study

3.10

Figure 3.34: Panoramic Study
Source: Author (2020)

Summation

3.11

The analysis followed the scales from the municipal scale to the scale of the two towns; down to that of Amalienstein's Mission Complex and Farm precinct. By looking at the site within these three scales, it is observed as a condition in a bigger field rather than an entity on its own. It takes into account all the external components which have an influence on the site while at the same time analysing where the best site for agave-based agro-forestry, infrastructure and buildings could be located.

It is vital to know how the ecosystems and natural systems work, to link up and strengthening them with this thesis's design rather than making irrational choices and not respecting them. The first main insight that arose from these contextual investigations was that the towns of Zoar and Amalienstein have no 'heart'. There is a lack of sense of community and leisure space. Being segregated from the R62 is a formula for missed opportunities.

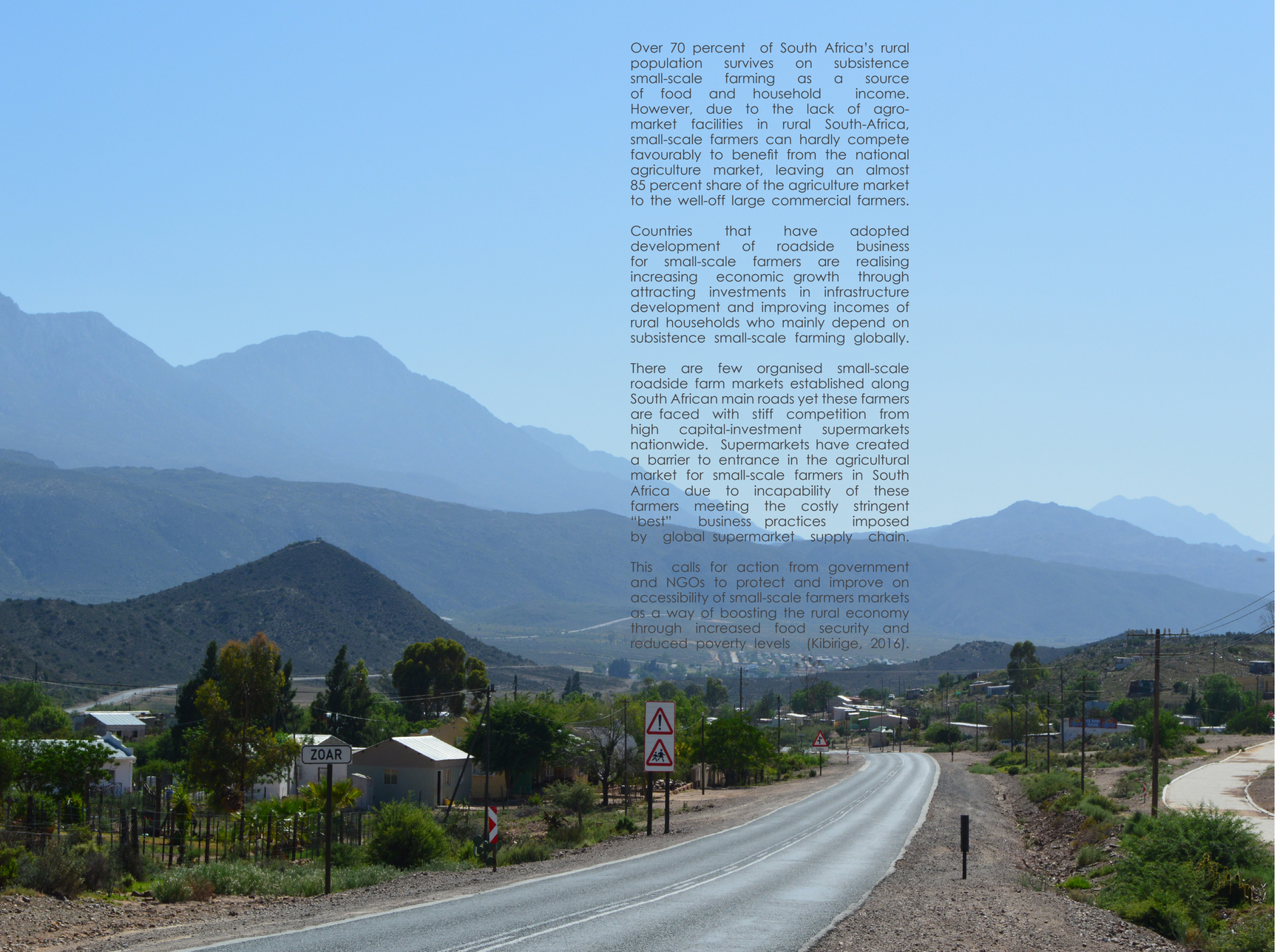
The spatial fragmentation experienced by these rural settlements can be largely attributed to the unplanned growth of the agricultural nature of the area and the need for water for self-sustainable farming. Due to the lack of focus on proper urban planning, these settlements are now characterised by undefined movement networks, inadequate linkages with main roads and ageing infrastructure. The aforementioned challenges contribute to the social barriers of unemployment and poverty.

Man-made as well as the site's natural structuring elements presented specific constraints and informants. This led to dominant spatial problems from which the urban framework was developed.

As a premise for the design, the existing, historic structures on the Amalienstein Mission Complex and Farm, will be largely kept in their original state as they are of historic significance. The existing intensive agriculture and proposed community nature reserves will be a 'no-go zone' for development. The 'go-zone' for potential for the design will be the under-utilised poor soil. Using the informant's map led to choosing the site for the building to be on the SW corner of the crossing between the R62 and Seweweekspoort. The agave based agro-forestry is to be to the North of the R62. The site picks up on the axis lines from the farmstead behind it which gives clues as to how the new design might develop.

‘PADSTAL’ & PRODUCTION TYPOLOGY

Ch. 04



Over 70 percent of South Africa's rural population survives on subsistence small-scale farming as a source of food and household income. However, due to the lack of agro-market facilities in rural South-Africa, small-scale farmers can hardly compete favourably to benefit from the national agriculture market, leaving an almost 85 percent share of the agriculture market to the well-off large commercial farmers.

Countries that have adopted development of roadside business for small-scale farmers are realising increasing economic growth through attracting investments in infrastructure development and improving incomes of rural households who mainly depend on subsistence small-scale farming globally.

There are few organised small-scale roadside farm markets established along South African main roads yet these farmers are faced with stiff competition from high capital-investment supermarkets nationwide. Supermarkets have created a barrier to entrance in the agricultural market for small-scale farmers in South Africa due to incapability of these farmers meeting the costly stringent "best" business practices imposed by global supermarket supply chain.

This calls for action from government and NGOs to protect and improve on accessibility of small-scale farmers markets as a way of boosting the rural economy through increased food security and reduced poverty levels (Kibirige, 2016).

4.1

[part]

Introduction:

General Information & Chapter Outline:

This chapter deals with the investigation of the building typology of the architectural intervention: a 'Padstal'. The investigations begin by understanding the role of 'Padstalle' in the South African context. It focuses on the three main components to the intervention which are the shop/retail component, the production component and the agricultural component.

The shop/retail component is investigated through four precedents. It takes into account the contextual connection and accessibility, spatial composition and programmatic functions and visibility. The production component will be investigated through looking at distillery as type. The agricultural component will be investigated in the next chapter.

The user group of the architectural intervention is a diverse set of people who vary in nationality, age and gender. They can be classified into two groups. The first group is the people who live in the community and who own and work in the complex. The second group is the visitors/tourists to the complex. These visitors/tourists will either quickly stop to take a break from their long journey or commute there intentionally to spend more time experiencing the complex as a whole.

The proposed 'padstal' will form part of the Zoar and Amalienstein settlements located next to the R62 in the Kannaland district of the Little Karoo. The project will include an agave agricultural component which will be the main financial component driving the proposed complex. The main function of the complex will be a visitor / tourist destination or pit stop which will include a retail area for local produce, an information area, agave distillery, a mezcaleria outlet, bakery, restaurant, craft stalls, conference facilities and teaching facilities as well as ablution facilities and green spaces.

The chapter results in an understanding of the programmatic issues relating to typology and explores this predominantly through the use of precedents which show how these issues have been handled in projects.

You may picture the following scene: You've been driving for three hours and the road stretches endlessly out in front of you, a seemingly depressing highway to nowhere. The kids are arguing and you've listened to your entire playlist - twice. You're desperate for a cup of coffee, a tasty bite and a break from the monotony of the drive.

Up ahead on the side of the highway, you see a brightly coloured roof with a sign announcing Moerkoffie (strong coffee) and freshly baked pies. You pull into the gravel driveway and an oasis of happiness unfolds before you. It is the staple of the South African road trip, the 'padstal', or farm stall. It's where you stop to recover your good humour and sample local culture and goods.

4.1

Introduction to 'Padstalle'

Farm Stalls are of the earth, they fit into the landscape and they exist in a synergistic interplay between the soil, the sky, the seasons, the long road, the day-to-day struggle for survival, and the joyful celebration of the land. There was a time when a farm stall was a lean-to, a wheelbarrow or just a small table and a sun umbrella on the side of the road where someone (usually the farmers' kids) sold excess farm produce.

And like most things they evolved. The people figured that, while they were selling the oranges, peaches, eggs or whatever fresh produce they had, they may as well put a few jars of marmalade or fig preserve on the table as well. And, after a while, they built a lean-to. Then the lean-to became a shack and the shack became a shed and the shed became a cute building with a veranda.

And next thing they've put in a table and some chairs and they're selling coffee and milk tart – and the roosterkoek or hamburgers, and some where along the way, an espresso machine gets installed, and a real live chef appears in the kitchen. Kitchen? Yes – evolution complete.

(Farm Stall to Farm Stall – Jennifer Stern)

What is a'Padstal'

4.1.1

A 'padstal' in its simplest form is a shop attached to a farm selling its produce on the roadside.

"Let the local grower present his wares to as many actual consumers as possible every day and he will soon learn that he is in no way dependent upon the grocer or any other middle-man to dispose of his produce, but he is likely to become concerned about how to increase his supply to keep pace with the growing demand."
Market Growers Journal, 1915

The original farm stall was closely connected to the farm, the farmer and the produce grown on the farm. The 'padstal' can sell two types of farm produce. Raw produce such as fruit and vegetables or processed farm produce like jams and preserves.

Thus it may be seen that the The 'padstal' typology is very variable in what types of activity it hosts. Activities depend in which region they are located, the agricultural environment and the type of tourist for which it caters. However, there are some fundamental principles in designing these establishments especially pertaining to the South African rural context. These will be explored in a few precedents which will follow this opening discussion.

Most 'padstalle' have a number signs spaced along the road towards them to inform drivers the kilometers to the rest stop and indicators of what services and products they may expect to find there. 'Padstalle' also depend on large signage boards to announce to travellers they have arrived there. 'Padstalle' form an integral part of South African road culture. These pitstops are a must and a highlight of every road trip. Each 'padstal' has its unique identity of a humble beginning and history.

Most 'padstalle' originally started along rural roads as a small stall at the farm gate, where the farmer would sell fresh, seasonal produce as a side-line to earn an extra income. Throughout South African rural areas, many independently owned farm stalls may still be found. Some evolved to bigger business ventures where a wide variety of products from various sources are sold.

Due to urban sprawl, 'padstalle' once begun in the countryside may now be found in urban areas. No two 'padstalle' are the same. Each one offers its own brand that is character-rich comfortable spaces. Some are small cosy retreats while others have evolved into bigger spaces resembling farm villages.

Figure 4.1: Knysna
Source: Unknown. (2011)

Figure 4.2: Mooiberg Farm Stall
Source: RoomsForAfrica. (Unknown)


Figure 4.3: Fresh
Source: Unknown (Unknown)


Figure 4.4: Timberlake Organic Village
Source: Unknown (Unknown)

'Padstalle' in South Africa

4.1.2&3

In South Africa 'padstalle' are usually privately owned which trade in local goods, with some sourced from outside manufacturers. Today, most 'padstalle' have their own signature attraction, whether it be homemade pies, 'moer koffie', biltong or locally brewed beer.

The average 'padstal' stock varies from homemade farm products like jams, preserves, butter, bread, cheese, dried fruit and nuts, to free-range eggs, pies, coffee or wine. Some stalls also sell crafts such as wrought-iron work, wooden furniture, clothes and handicrafts.

'Padstalle' usually offer some kind of eatery or coffee shop where tourists may be attracted to sample typical South African fare such roosterkoek , pannekoek, koeksisters, bobotie and ginger beer. Favoured attractions are animal petting areas for children and produce picking.

'Padstal' structures were usually simple structures aimed as a solution to an immediate need without plans for future development. Some were existing structures and others purpose built. Additions were later undertaken to accommodate the farm stall's growth. This usually led to buildings with interesting nooks and crannies and some with a surprising juxtaposition of different styles.

Contemporary 'padstalle' are not associated with a specific farm but are businesses in their own right. They are usually well planned and situated in or on the edge of urban areas. 'Padstalle' have evolved into valued destinations for respite during a long journey.

Farmers' markets and festivals
Farmers' markets and festivals are a type of temporary 'padstal'. Being somewhat ephemeral, they can be hard to track down. There are the old dependables, some promising new markets and fests, some that are so obscure almost no-one other than the friends and family of the organisers know about them, including some that have become "has-beens" that may well be on the way out.


Figure 4.5: Die Pampoen Padstalletjie.
Source: Unknown (Unknown)

Figure 4.6: Ouma Miemie's Farmstall
Source: Unknown (Unknown)


Figure 4.7: Interior
Source: Unknown (Unknown)


Figure 4.8: Exterior
Source: Unknown (Unknown)

The Importance of Signs

The purpose of a sign:
1. To indicate the location of a place and announce the driver's imminent arrival there. 2. To label the name, price, grade, or quality of the consumer goods. 3. To advertise brand names or trademarks.

Clever artistic signs appealing to the eye are often imprinted on the consumer/ visitors' memory. Signs are required to be informative and effective in their appeal. Signs at frequent intervals should be placed on either side of the highway to alert the motorist to the stall's proximity.

These are to advertise the specialities of the stall. This notice sign will also serve to give the traveller sufficient time to make a decision to stop or not.

Something distinctive about the sign will not only aid in causing the motorists to stop, but will also be a big help in luring them back again. It is much easier to remember a 'padstal' if there is something distinctive about it.

The Development/Typologies of the 'Padstal'

Signs on Farm Gates

Advertising produce from farm gate

The farmer would put a sign on his entrance gate, advertising the fresh produce he has to sell on his farm. The motorist would then drive to the farmers house / out building to buy the produce.

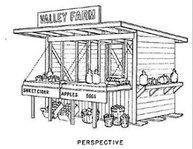
Roadside Farm Stands

Selling produce from temporary structure

A roadside stand may be just a table on the lawn, where surplus garden products can be displayed for sale from time to time.

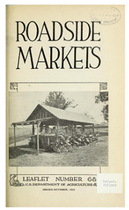
Selling produce from permanent structure

It may be a more permanent stand in front of the home or on a nearby highway, with a display counter or shelves, and a roof to protect the produce and the attendant from both sun and rain.



PERSPECTIVE


Fig. 172.—Roadside stand for selling honey. On important highways these stands are becoming increasingly numerous and dispose of a large volume of honey



Padstalle

Selling produce from permanent building

A 'padstal' is a fairly large structure where several farm families cooperate to sell most of their fruit and vegetables and other products to steady customers and passing motorists who like to buy direct from the growers to get freshness and high quality.

This plan was developed for the operator who plans to sell a considerable amount of farm produce on the retail market.

Location is an important factor. A market of this size should be on a well-traveled road, since a large volume of business is required to justify the cost of such a building. Ample parking space, off the roadway, should be provided to accommodate the greatest number of cars that may be expected at one time.

Selling produce from purposely designed 'padstalle'

These buildings are designed for the purpose of being a 'padstal'. These 'padstalle' sells farm produce and a wide variety of products. They have small bakeries, restaurants and public restrooms in them.

Proposed Route 62 Farm 'Padstal'

Petrol Stations

Establishment beside a road selling fuel for motor vehicles

Petrol Stations serves as a place where you can fuel up your motor vehicle. They also have express supermarkers, large bakeries, famous fast food restaurants, gift shops, well-known restaurants and vending machines.

Figure 4.9: Development
Source: Author (2020)

The Pampoen Padstalletjie

On R60 between Worcester and Robertson
Western Cape

-34° 14' 01" S
19° 33' 91" E

4.2.1

The Pampoen Padstalletjie is investigated as a precedent as it is an appropriate and authentic example of a traditional South African farm stall. This farm stall is attached to a farm and is a side-line to earn an extra income for the farm. The Pampoen Padstalletjie stall started as an antique shop. The owners gradually began to introduce one or two farm products on to the shelves amongst the antiques such as seasonal vegetables and homemade jams.

Contextual Connection & Accessibility:

The Pampoen Padstalletjie is in the rural district of Worcester, Western Cape, South Africa, on the route R60. The R60 is a national road connecting Worcester with Robertson, Swellendam and the N2 national road. The success of this farm stall stems from its connectivity and engagement with the R60 as it is easily accessible from the R60.

Figure 4.10: Die Pampoen Padstalletjie Outside
Source: Hettie (Unknown)

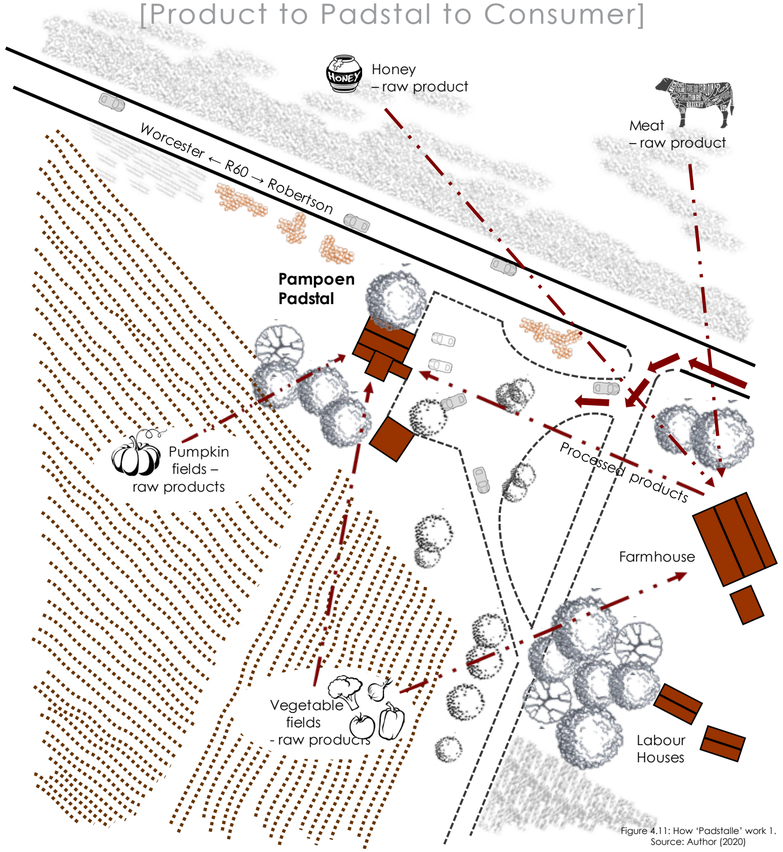


Figure 4.11: How 'Padstalle' work 1.
Source: Author (2020)

Spatial Composition & Programmatic Functions:

The Pampoen Padstalletjie is housed in a small farm worker's house where farm-fresh produce, dried fruit, nuts, jams, preserves and an assortment of fresh baked goods are sold. There is also a small area where coffee, tea and rusks may be enjoyed.

Figure 4.15: 3D
Source: Google Earth (2020)

Visibility:

Situated in a rural area, this farm stall can be seen from afar, as a wide array of pumpkins of all sizes, colours and varieties are displayed in huge masses under a big tree in the yard and in front of the building. Literally thousands of pumpkins in all shapes and sizes are scattered outside, inside and even on top of the Pampoen Padstalletjie (Jansen van Vuuren, 2019). This display of colour is an enticing sight and impossible to miss. At both sides of the building there is also signage advertising the venue.

Figure 4.12: Pampoen Padstalletjie 1.
Source: Hettie (2020)

Figure 4.13: Pampoen Padstalletjie 2.
Source: Hettie (2020)

Figure 4.14: Pampoen Padstalletjie 3.
Source: Hettie (2020)

Materiality & Tectonic:

Corrugated iron roofs

Whitewashed walls

Figure 4.16: Materiality
Source: Google (2020)

Timberlake Farm Stall Village

4.2.2

Off N2, halfway between Wilderness and Sedgefield
Garden Route
South Africa

-34° 00' 39" S
22° 41' 89" E

Timberlake Farm Stall, is investigated as a precedent as it is an appropriate example of a traditional South African farm stall that has grown from a one cabin-style farm stall into a small village of cabin-style shops. Today, Timberlake Farm Stall is not attached to a specific farm, but is rather a business venture in its own right.

Figure 4.17: Timberlake
Source: Facebook (2012)

Contextual Connection & Accessibility:

Timberlake Farm Stall is situated off the N2, between Wilderness and Sedgefield, along the Garden Route of South Africa. This complex is easily accessible from the N2, as it is situated quite a few meters off the main road.

Figure 4.18: Timberlake Map
Source: Facebook (2012)

Visibility:

Timberlake Farm Stall is not situated directly to the side of the N2. It is situated in a forest area, a few meters off the N2 and on a lower level than the N2. This makes it difficult to see when driving between Wilderness and Sedgefield. Except from the freestanding sign at the entrance to the farm stall and advertisements on the roofs of the small buildings, there are no other visible signs that draw attention to the complex. The complex can be easily mistaken for a residential complex due to all the small buildings.

Materiality & Tectonic: Local and rustic


Log cabins inspired by historic forests cabins


Corrugated iron roofs inspired by historic forest cabins


Bamboo from the vicinity


Local stone from the vicinity


Figure 4.19: Timberlake Materiality
Source: Facebook (2012)
Indigenous vegetation – milkwood trees

[Product to Padstal to Consumer]

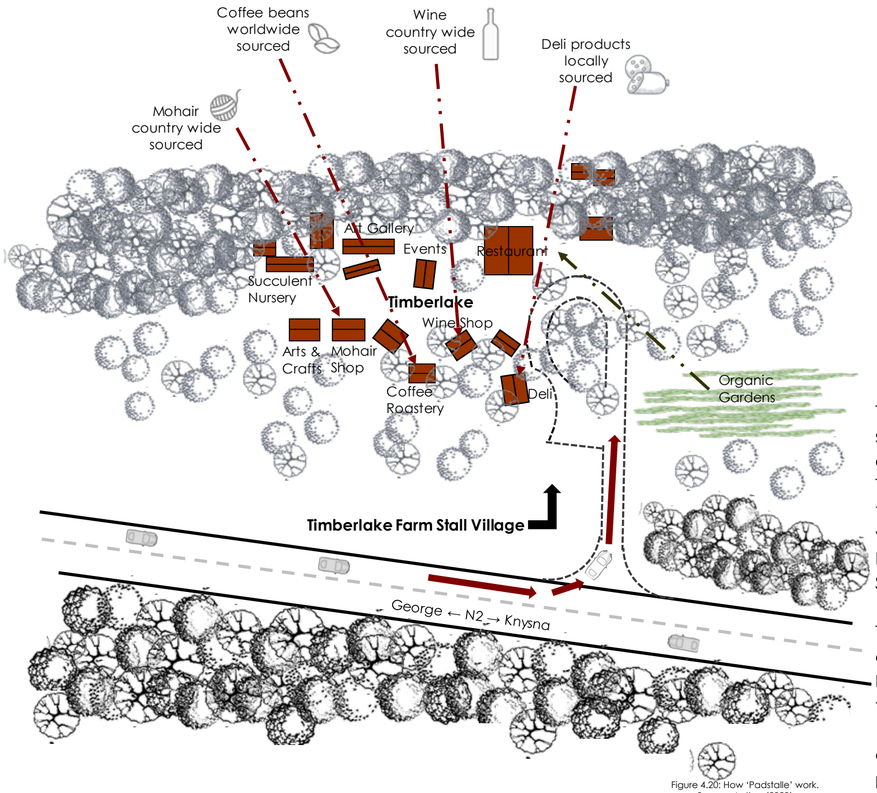


Figure 4.20: How 'Padstalle' work.
Source: Author (2020)

Spatial Composition & Programmatic Functions:

Timberlake Farm Stall is a complex of small cabin-style shops nestled amongst organic gardens and indigenous trees. These indigenous trees, together with the cabin style buildings, give the village setting a quintessential Garden Route feel. Timberlake Farm Stall supports local producers.

The target market is the community and tourism industry. Here you can shop for sweet and spicy treats, cheese, wine, health products, 'Faerie' gems, art , leather-; ceramic-, and mohair products as well as succulent plants. Outdoor facilities for children include a race track, jungle gym, trampoline, tame goats for petting and enjoying their antics, the Fantasy Fairy Garden walk and more.


Restaurant

Coffee Roastery


Succulent Nursery


Events


Deli


Wine shop

Tredici Farm Stall

68 Somerset Road, N2. Swellendam,
between Cape Town and
the Garden Route.

34° 01' 44" S
20° 26' 32" E

East facing front facade

North facing façade / Somerset Street

Figure 4.23:
Source: Unknown (Unknown)

The farm stall, Tredici, is investigated as a precedent as it sets the tone for an appropriate and specific design of a contemporary farmstall which provides useful resources to its users in the context of Swellendam urban area. It improves the quality of urban space through architecture and expresses itself as a rural icon within the urban fabric due to the historically Cape Dutch farmstead elements used throughout the building. Tredici provides economic benefits through private, public and tourism ventures. This farm stall is not attached to a specific farm but is more a business venture in its own right.

Contextual Connection & Accessibility:

Tredici is situated in Swellendam, in a semi-industrial area, off the N2, between Cape Town and the Garden Route. This farm stall is situated below the N2 and is not accessible from the N2, but from a secondary road leading from the N2. There is no direct connectivity and engagement with the N2.

Visibility:

As Tredici is situated below the N2 and is only accessible from a secondary road, it is not easily seen from the N2. Apart from the name "Tredici" on the building, there is no other free-standing advertisement along the N2 that draws the attention of passers-by. The only significant attraction is the architecture of the building inspired by Cape-Dutch elements combined with French styles. The building radiates an impression of grandeur and opulence that is far removed from the traditional South African farm stall.

[Product to Padstal to Consumer]

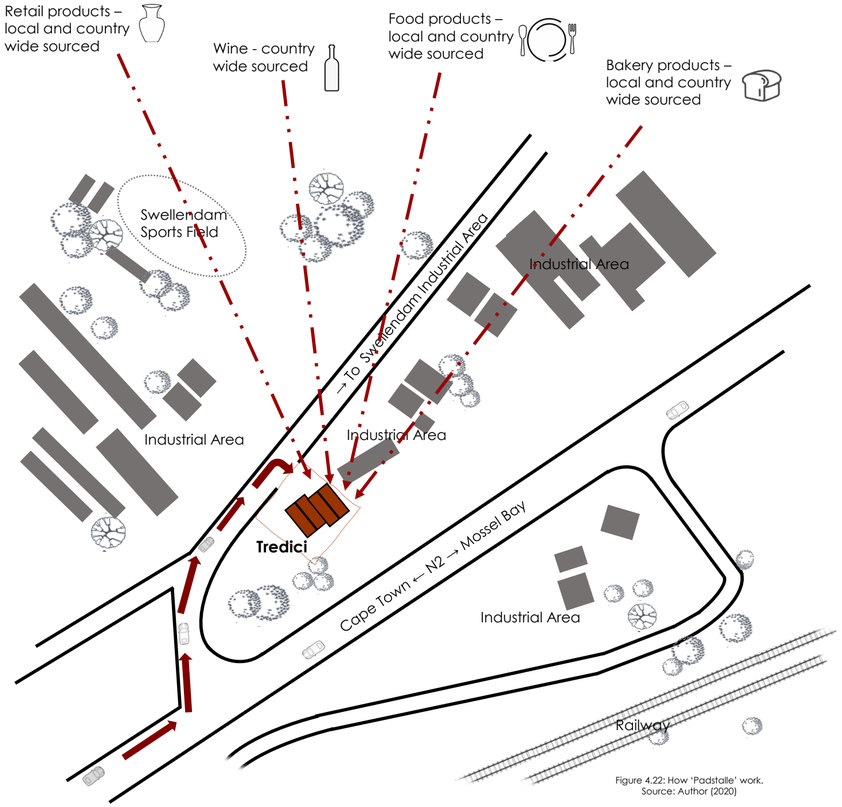


Figure 4.22: How 'Padstalle' work.
Source: Author (2020)

Figure 4.24:
Source: Unknown (Unknown)

Materiality & Tectonic: Local Cape Dutch elements

Bamboo ceilings and stonework inspired by local Cape Dutch elements

Indigenous vegetation

Wrought iron accessories inspired by French elements

Figure 4.25: Photographs showing materiality and tectonic nature.
Source: Unknown (Unknown)

Spatial Composition & Programmatic Functions:

The building spatially integrates with its surroundings, allowing movement flows to pass through the space, thus opening up to the public and integrating with its context. The building has a diverse set of functions centred around a retail shop, a restaurant, a boutique wine shop, bakery, a function venue as well as outdoor sitting and entertainment areas.

Retail

Restaurant

Function venue

Wine Boutique

Bakery

Figure 4.26: Photographs showing interiors
Source: Unknown (Unknown)

Rest stop, Michi-no-Eki

Tono Kaze no Oka Rest Area

Located alongside the National Highway 283 with a large wind turbine as a landmark.
8 Chiwari-2-1 Ayaoricho Nissato, Tōno,Iwate 028-0531, Japan
39° 19' 96" N
141° 30' 87" E

4.2.4

A Michi-no-Eki is a roadside rest area for those driving across Japan. Michi-no-Eki are located along national highways and provide free parking space, rest rooms, and regional tourist information for road travelers. There are currently over 1,000 locations of these roadside stations throughout Japan.

Michi-no-eki is investigated as a precedent as it is an appropriate example of a rural "community based type of farm stall". Michi-no-eki are convenient stop-offs for passing motorists to learn about what to see and do in an area as well as being important community hubs for local residents. They are often located in rural areas with dwindling populations, and local authorities see them as vital resources for local revitalization (Ryūsaku, 2019).

[Product to Padstal to Consumer]

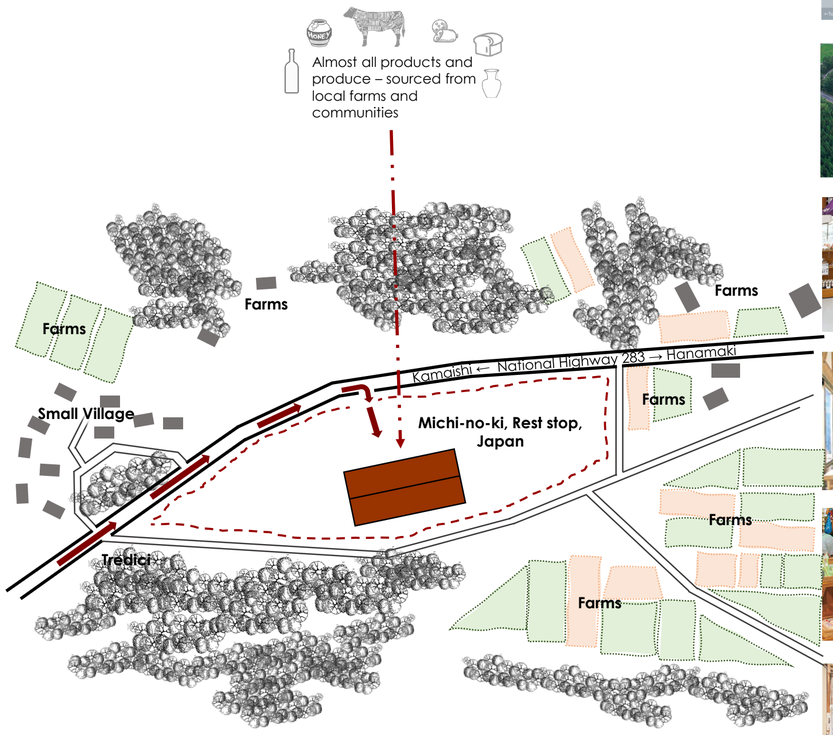


Figure 4.27: How 'Padstalle' work.
Source: Author (2020)

Figure 4.28: Plan.
Source: Unknown (Unknown)

Figure 4.29: Aerial.
Source: Google Earth (2020)

Figure 4.30: Shop.
Source: Unknown (Unknown)

Figure 4.31: Rest.
Source: Unknown (Unknown)

Figure 4.32: Fresh Produce.
Source: Unknown (Unknown)

Figure 4.33: Interior.
Source: Unknown (Unknown)

Spatial Composition & Programmatic Functions:

In Japan the physical form of the roadside station consists of a collection of buildings within a specific area. Apart from the two main functions, the roadside station has various other functions such as an information centre, providing green open areas, educational facilities and outlets to promote local products. Some roadside stations even form small villages that include agricultural components and distilleries.

Roadside stations offer service functions to road users, which at the same time provide economic empowerment to the local community. Roadside stations have two main functions.

One is to create a resting place for road users. The other is to improve the economy of the surrounding community by generating employment.

Roadside station components are divided into four types such as the main components the supporting components, the additional components, and the limited additional components. Principles and elements of architecture on all parts of roadside station are adapted to its surrounding area with attention to local perception.

Visibility:

There are more than 1000 Michi-no-eki in Japan which are advertised through a distinctive logo.

Contextual Connection & Accessibility:

A roadside station is a place located at the side of a road that creates a strong link between road users and local communities.

The concept of a roadside station was masterminded in Japan to create a rest area for those driving across Japan. A roadside station in Japan is called a Michi-no-Eki

Figure 4.34: Logo.
Source: Unknown (Unknown)

Figure 4.35: Aerial Plan.
Source: Google Earth (2020)

Materiality & Tectonic: Every Michi-no-ki has its own special brand and uniqueness.

Figure 4.36: Photographs.
Source: Unknown (Unknown)

4.3

Distillery as Type

Definition of a Artisinal/Craft Distillery

The American Craft Spirits Association defines a craft distillery as follows:

A distillery that values the importance of transparency in distilling regarding the ingredients, the distilling, the bottling location and the aging process.

A distillery that produces fewer than 750,000 gallons of liquor annually.

A distillery that is independently owned and operated, with more than a 75 percent equity stake in the company and operational control.

Figure 4.37: Experience tasting.
Source: Pinterest (2020)

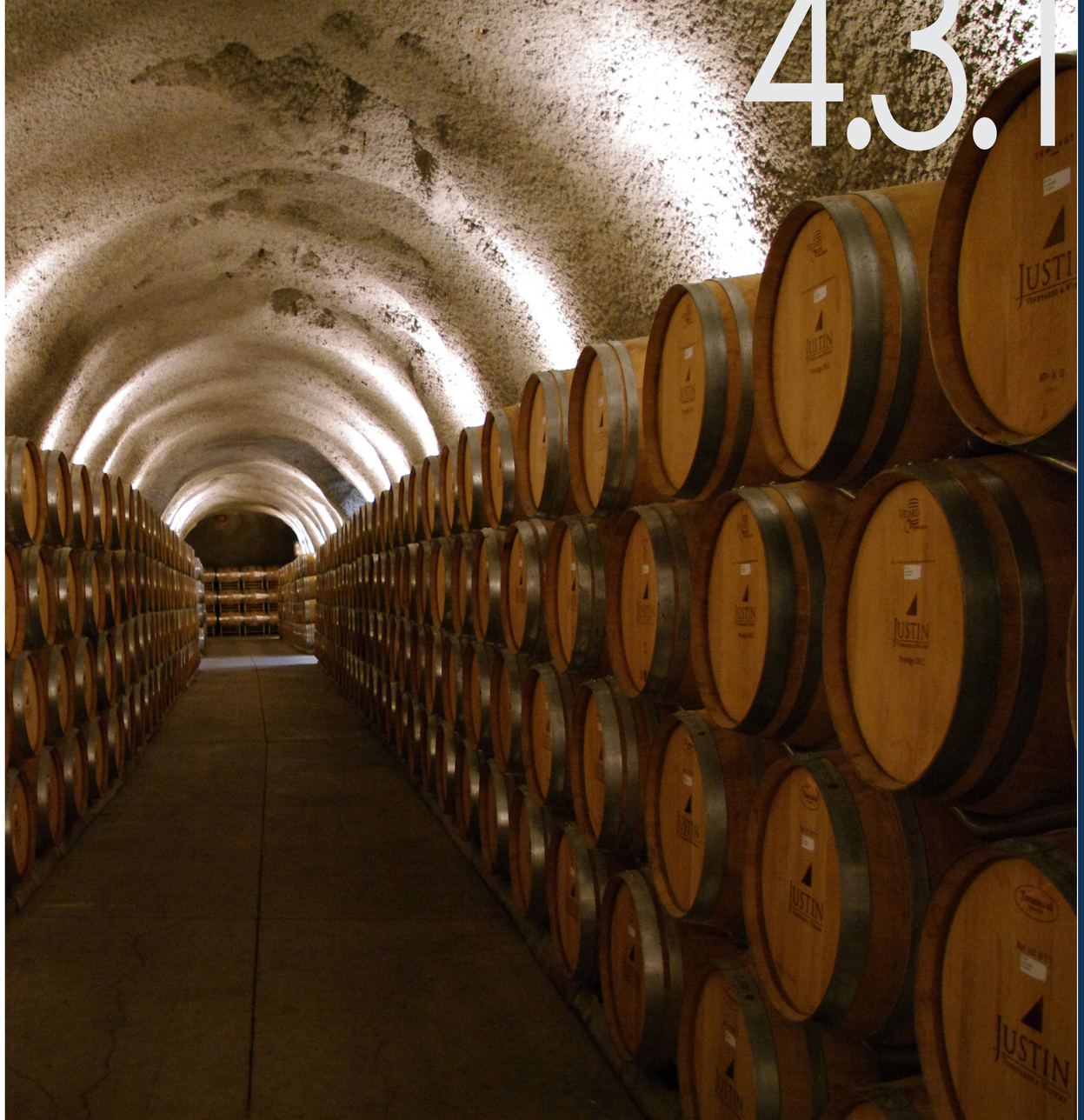
Craft distilleries are a relatively modern art. Whiskey, rum, vodka and gin, as we know them today, were developed at the time of the industrial revolution. Although distillation is a rather simple process of separating the alcohol from a fermenting, carbohydrate-based brew by selective boiling and condensation, the equipment required for efficient and safe spirit production took many hundreds of years to perfect.

In South Africa there is now a resolute and growing band of craft or artisanal distillers responding to the need for unique specialist spirits. Eau-de-vie, pot still brandy, cask aged whisky, gin, vodka, grappa, agave spirit and absinthe can now be found, all made in small quantities to exacting standards. Craft distillation is about quality, choice and individuality. Artisanal distillers are hands-on specialists who transcend the gap between art and alchemy to create unique spirits for individuals (Jorgensen's craft distillery, 2017).

Micro distilleries become a whole new world in itself as it introduces individuals to exclusive, local and premium spirits carefully constructed by the hands of craft distillers. One endures the distinctive quality of the culturally rooted, handmade product as soon as you inhale the sweet scent of the 'grain to glass' embodiment.

The first taste of the finest craft spirit creates a passionate and personal experience for the consumer where they truly feel this artisanal brand was composed specifically for them (Smith 2015, online). In South Africa, micro distilleries are legally defined as distilleries with an annual capacity of less than 2 million litres of spirits.

Micro distilleries are regulated through provincial laws rather than the national liquor laws (as prescribed in the Liquor Act of South Africa, Act 59 of 2003). In the following section, distillery precedents will be investigated. Each precedent is within a different context, but they all have relevance to the design task of a distillery space.



Milagrito Mescal Pavilion

Santiago Matatlán, Oaxaca in Mexico
Ambrosi I Etchegaray
2014

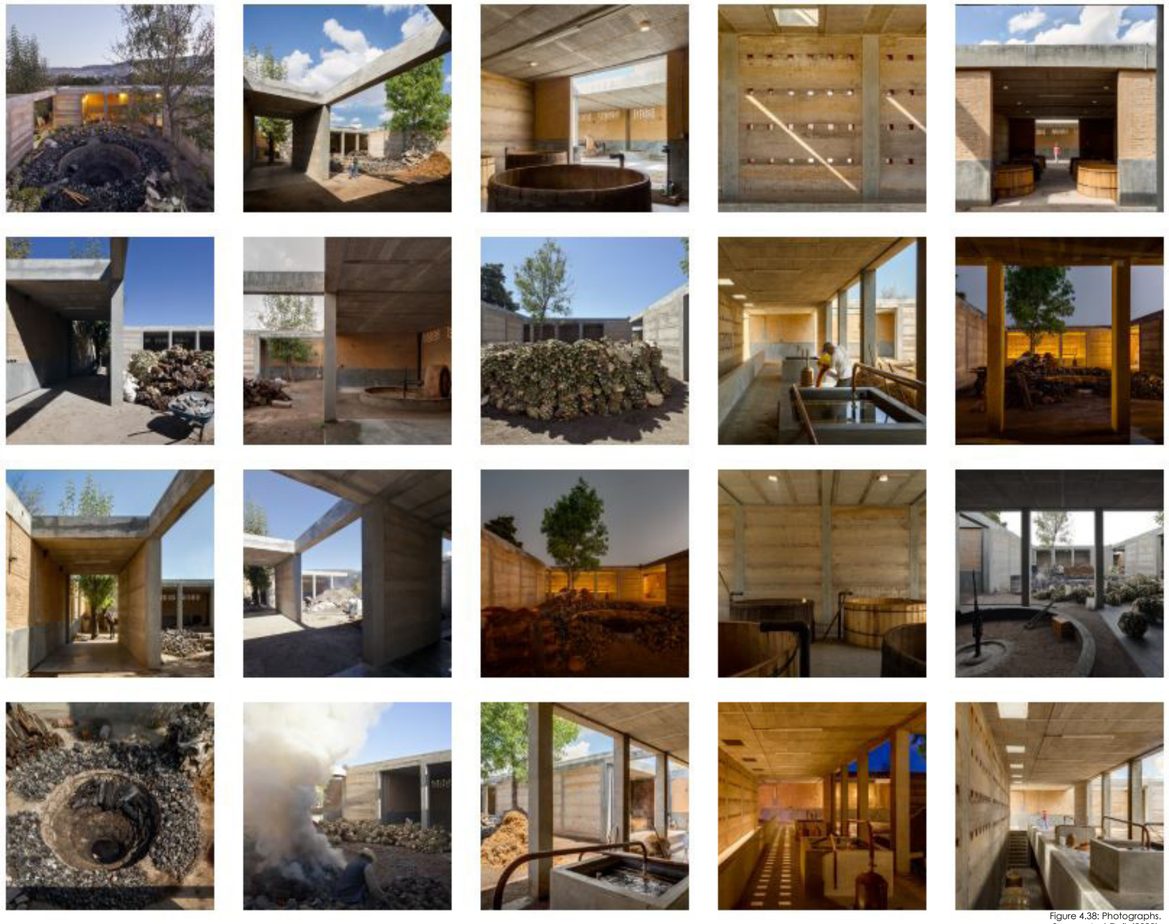


Figure 4.38: Photographs.
Source: ArchDaily(2020)

4.3.2

[plan]

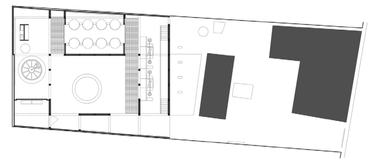


Figure 4.40: The Plan.
Source: ArchDaily(2020)

[section]

Figure 4.41: The Section
Source: ArchDaily(2020)

[process]

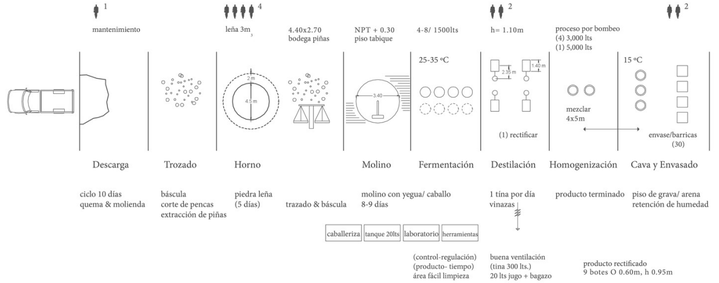


Figure 4.39: The Process.
Source: ArchDaily(2020)

The Milagrito Mezcal Pavilion is a mezcal factory situated in the small, traditional town of Santiago Matatlán, Oaxaca in Mexico. Here local producers struggle to preserve its product in the rising market where traditional means are part of the artisanal production. The commission was to renew the spaces for production, gaining the necessary approvals to export the mezcal.

The spatial layout organises the production phases around the earth oven, which forms the heart of the entire production process and design. The structure is kept simple with concrete slabs forming square, geometrical spaces. Frames over frames limit each space and rammed-earth from the plot is placed as a ritual to the land.

Hendrik's Gin Palace

Michael Laird Architects
55° 15' 22" N
4° 49' 44" W

Figure 4.42: Aerial.
Source: Google Earth(2020)

Hendrick's Gin Palace is a precedent for a large-scale distillery design. This building for the famous William Grant & Sons is situated on the Ayrshire coast, overlooking the volcanic island of Ailsa Craig, Scotland. It is iconic in its representation of the ideals of the distillery typology as the architects took the programme as the main driving force of design and created a functional, process driven building.

The principal design aim was to capture the elaborate brand within the architecture and create a building that was the physical embodiment of the gin. This has been achieved through attention to detail, a simple but rich material and textural palette, depth of concept and an innovative approach to collaborative design. The distillery is part of a massive industrial distillery complex, set in the rural landscape of Scotland. Pamela Selby, the global brand director for Hendrick's added: "The Hendrick's Gin Palace in its design and experience, is intended to inspire curiosity, open minds and serve as a platform for invention."

Relationship to context:

The site includes the Girvan distillery, as well as the new Ailsa Bay malt distillery and a product development laboratory.

Spatial Composition:

The distillery consists of four key spaces: a Victorian-inspired walled garden which encloses three glass houses; a central accommodation spine (which houses a bar, laboratory space and lecture theatre), three individual still houses and an external service yard with support facilities for the distillation process. The main glass house is situated centrally within the walled garden. It is flanked by two smaller glass houses on either side which house a variety of exotic botanicals.

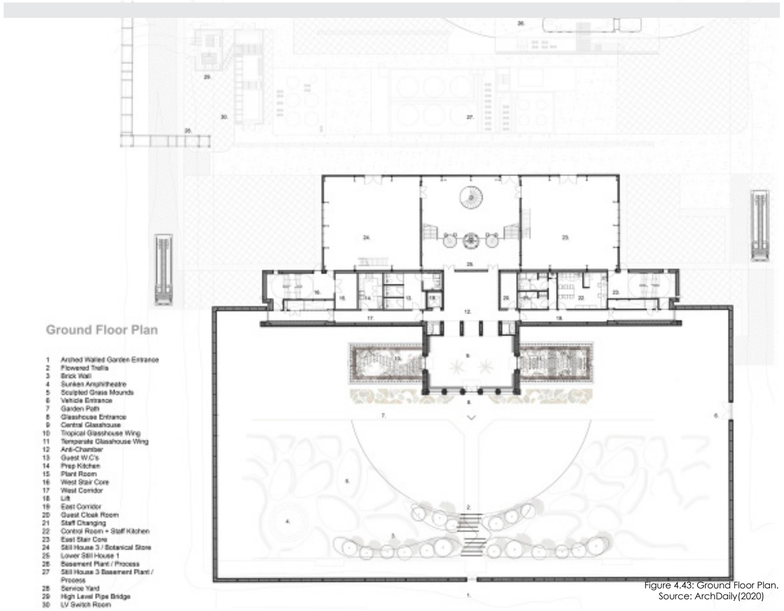
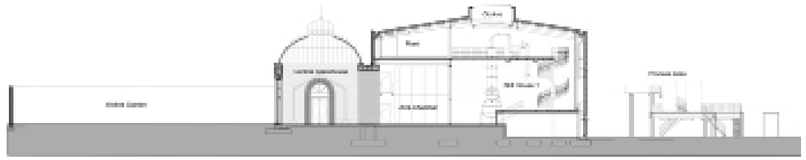


Figure 4.43: Ground Floor Plan.
Source: ArchDaily(2020)



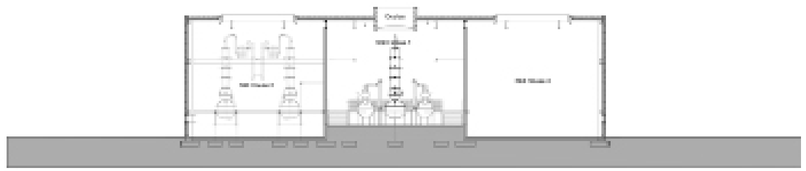


Figure 4.44: Section A & B.
Source: ArchDaily(2020)

Materiality & tectonic:

Victorian-inspired curved glass roof

Stained glass dome

Marmorino - crushed marble and lime putty

Brick

Concrete

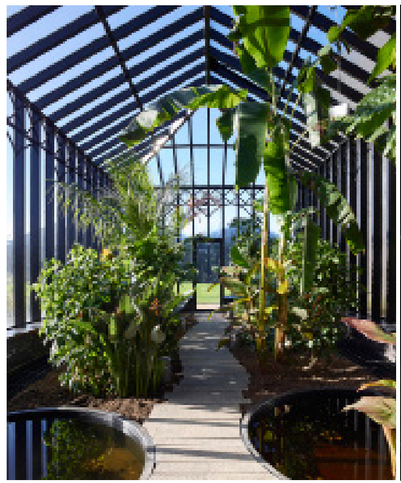
Metal

Gothic inspired door

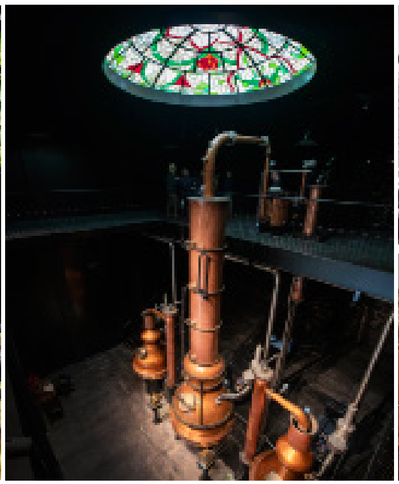
Grass inspired by the Scottish landscape

Programmatic functions:

A central accommodation area; three still houses; a laboratory; a lecture theatre, glass greenhouses; a bar; library; lecture theatre; walled garden and an outdoor service area with facilities for distillation.



Glass green house

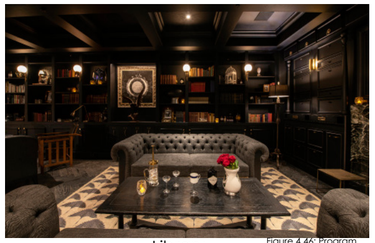


Still house

Laboratory

Central accommodation area

Bar



Library

Figure 4.46: Program.
Source: ArchDaily(2020)

Comparative MATRIX

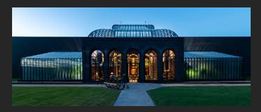
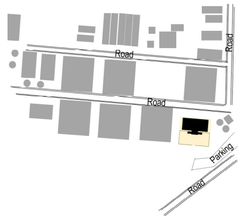
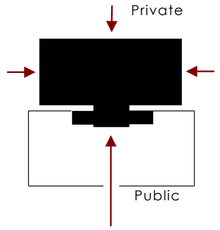
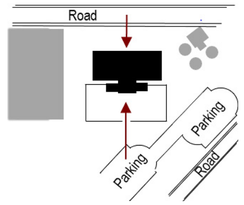
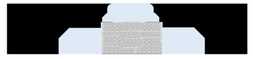
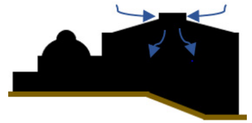
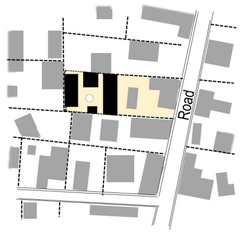
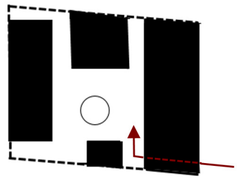
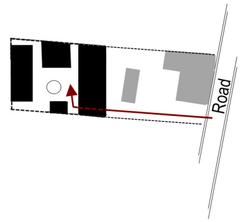
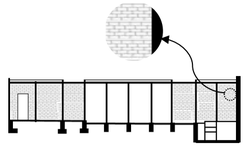
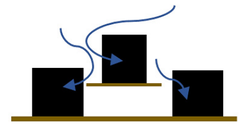
	Reason for Precedent	Contextual Integration	Relationship to Context	Plan Type	Access	Techne and Expression	Climatic Approach
Hendrik's Gin Palace & Distillery  	Combining stereometric and stereotomic.	 Building is grounded to en partly in the earth and organised along a slope.	 Building in industrial zone in rural landscape.	 Main building with simple and clear geometries - responds to the function organisation.	 Front access direct from road, via parking area. Back access from road.	 Concrete, steel and brick for manufacture plant with brick and glass 'office' extension.	 Louvres in roof to provide ventilation.
Milagrito Mezcal Pavilion  	Building designed around the artisanal process of mezcal production.	 Building is grounded to en partly in the earth and organised along a flat plane.	 Building in urban landscape.	 Open courtyard building but only one entry through building.	 Panhandle entry from road through a yard with buildings.	 Concrete frame with brick infill with concrete flat roof.	 Courtyard arrangement to provide cross ventilation.

Figure 4.47: Comparative Matrix.
Source: Author (2020)

4.4

Summation

The typological investigations have revealed key insights and principles with which to engage within the design. It is understood that there exists an opportunity to enhance the socio-economic conditions of the Zoar and Amalienstein communities in the Little Karoo, through a proposed collective cooperative tourism and agricultural programme.

Through investigation the 'padstal' typology has been understood to be an important space and a cultural icon along South African roads where people can stop to rest, but at the same time it serves as an income generator for the farmer, an independent business owner.

The Japanese roadside station, also a cultural icon along Japanese roads, works on the principal of community social infrastructure and is a community driven project to better the economic status of the whole community. The proposed project will be more of a hybrid between a South African 'padstal' and a Japanese roadside station.

Precedents of distilleries were investigated as a typology of productivity as well as key components to the distillery as typology.

PRINCIPLE EXPLORATIONS

[Ch. 05]

5.1

[part]

Introduction

General Information & Chapter Outline:

This chapter will follow investigations into precedent studies to extract architectural principles for approaching the issues of spatial layout identifying positive and negative spaces. Following the 'How to create a sense of place' model, The Karoo Wilderness Centre by Nico van der Meulen Architects and Falling Water by Frank Lloyd Wright, will be used as a reference.

The proposed design of a 'padstal' consists of three main components. The shop/ retail component, the production and the agriculture component. In this chapter an investigation regarding sustainability and the process of agave production will be undertaken to provide more insight into the production and agricultural components of the proposed design.

This chapter acts as a conclusion to the research component, whilst introducing particular design principles to be adopted in the development of a design in the following chapters.

5.2

Exploration of South African Karoo Architecture

"The typology of the landscape, or place, determines the settlement patterns of farmhouses."

- Christian Norberg- Schultz

Exploration of South African Karoo Architecture

[timeline]

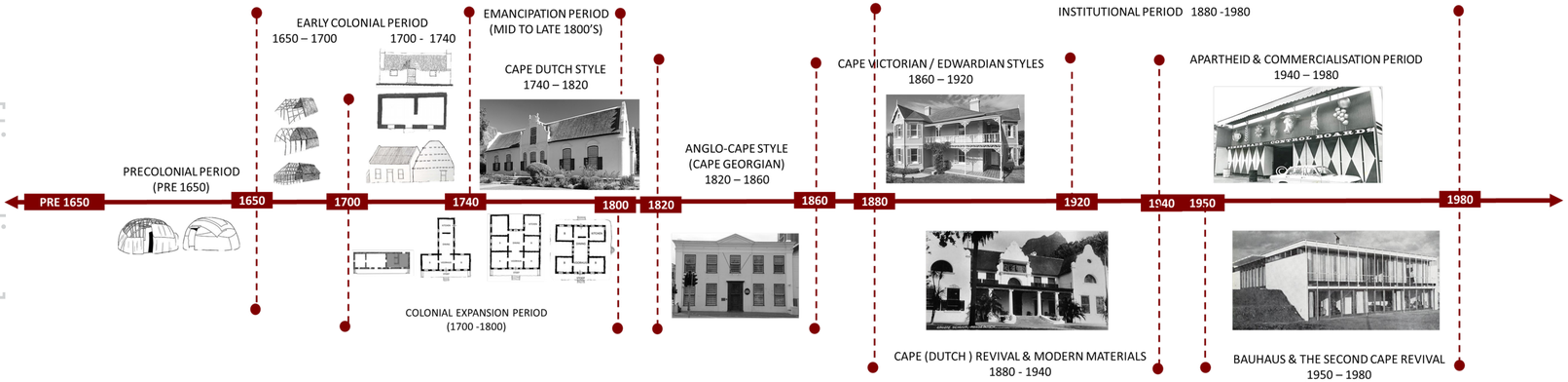


Figure 5.1: Timeline.
Source: Author (2020)

There is a clear European influence in the Karoo small town architecture, with many of these houses being simplified versions of the popular Regency, Late Georgian, Victorian and Edwardian styles of that time.

Typical characteristics include a façade, flat roof and quite often a prominent covered verandah (stoep) as protection against the harsh sun. The climate of the Karoo provided an important informant of architectural form and expression which presented the opportunity for outdoor living. Consequently, the 'stoep' originated, which provided the farmer with a reception space. The 'stoep' was a raised platform paved with irregular flat stone slabs with seats on either end. It later became the informal social space of the house.

With regard to shelter, the roofs have thick wooden beams for ceilings, and, before corrugated iron roofing sheets became available in the late 1800's, a layer of mud was packed on to the beams over which thatch was laid.

Wooden shutters cover the windows to keep out the intense daytime heat and the cold night air in winter.

The first houses in the Karoo were built of local materials and were simple, rectangular structures which were single storeyed, consisting of a rectangular wattle framework covered with mud and straw.

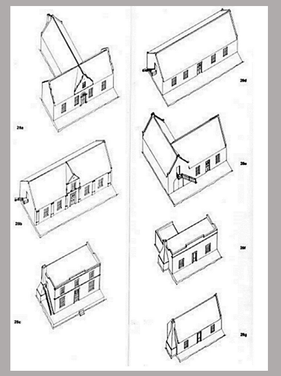
Stone and handmade bricks plastered with a breathable mud plaster were later used to build a more permanent structure.

Each Karoo house has its own character and today the verandah may vary from cement (where the original stonework can often be found underneath) or tiles, to the very typically South African red polished stoep. Some homes have been restored using traditional thatch.

The more elaborate homes have traces of Victorian style with charming 'broekie lace' (decorative iron friezes) and Victorian coal fireplaces, but they still maintain a Karoo-like integrity. The common wind pump in the back garden also adds a Karoo-like authenticity to the buildings.

Corbelled houses, built by the Voortrekkers, can be found in the Karoo countryside (again a style found across Europe).

Diagram of house types from the earlier period of village development in South Africa



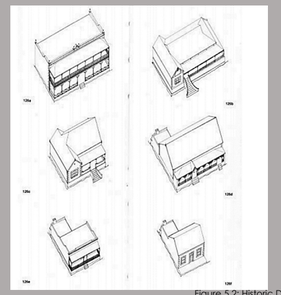


Figure 5.2: Historic Drawings.
Source: Unknown (Unknown)

> **"These are handcrafted old buildings. They have a simplicity, an elegance, a sense of space and internal volume from high ceilings, and thermal efficiency."**
>
> **(Theresa Hardman)**

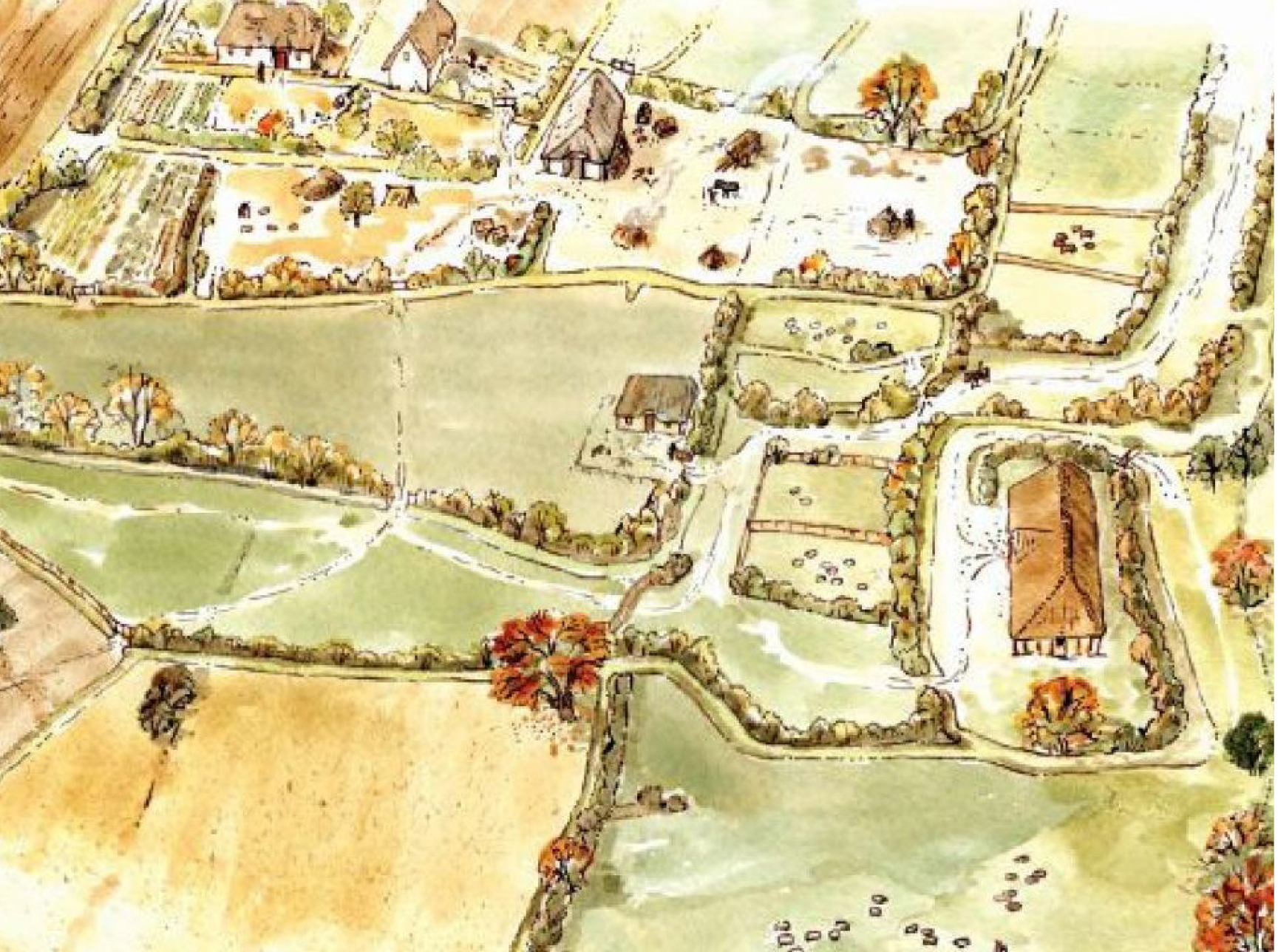
In the dry Karoo climate with its scorching summers and freezing winters, houses that were built by hand a hundred years ago with simple mud, reeds and stone are often still standing. More than that: they breathe and flex like living things. The dry environment, extreme as it is, has shaped them, tempered them and mostly preserved them.

Houses with peach pip floors, sash windows, mud plaster, sunbaked clay bricks, cross- and Bible doors, broekie lace fretwork and real shutters can still be found in the Karoo.

Verandah roofs are distinctively curved into shapes that resemble billowing canvas, in styles called Bell-cast, Bull-nose and Regency.

[Photograpic Study]

Figure 5.3: Photographs.
Source: Unknown (Unknown)



5.3

The Nature of Farmstead's Spatial Layout

Historic Farmsteads - Spatial Layout

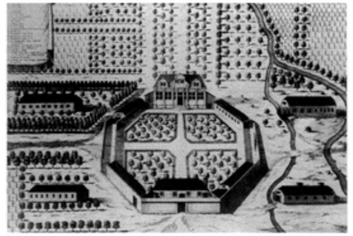
5.3.1

GROOT CONSTANTIA

Sketch by E.V van Stade, 1710

VERGELEGEN

View of Vergelegen depicted in Korte Deductie,1708



View of Vergelegen depicted in the Contra Deductie, 1712

Figure 5.4: Historic.
Source: Unknown (Unknown)

An investigation into the spatial layout of the historic farmstead typology is done to obtain an understanding of the social meaning of the farmstead.

Historical Farmstead Overview

When the High Commissioner of the Dutch East India Company (VOC) visited the Cape in 1685, he gave precise building instructions to the governor of that time establishing the characteristic elements of Cape vernacular architecture.

Low walls were to be built to connect buildings and structures creating an enclosed farmstead that resembled a Dutch 'Hofstede'.

This was the origin of the ring-walled farmsteads and VOC outposts that dot the Cape landscape today. Even Simon van der Stel, the Cape governor, applied these instructions in setting out his own estate, called Constantia, and at least one outpost of the company, which later became known as Vergelegen.

A wide variety of exotic fruits and vegetables sourced from across the globe were also planted here as experiments, laying the foundation of agricultural development in South Africa (Du Preez, 2012).

Once it became desirable, the unique structure, form and style of the iconic Cape farmhouse complex developed quickly.

Classical principles were employed in the location, planting, layout, form and decoration of the settlements, such as order, hierarchy, symmetry and axiality (Berman 2004).

Farm 'werfs' (yards) were carefully designed, for instance with the homestead at the head of a forecourt, often splayed in layout to appear more impressive to the approaching visitor. There was a tendency towards 'werf' enclosure, in which buildings were linked by stretches of 'werf' walls, a space-organising device denoting the extent of 'home' in the open landscape (Fransen, 2004).

Farmsteads, in particular traditional farm buildings of 19th century or earlier, make a fundamental contribution to local distinctiveness and a sense of place, through their varied forms, use of materials and the way that they relate to the surrounding form and patterning of landscape and settlement.

This is because their character has been shaped by their development as centres for the production of food from the surrounding farmland (Malan, 2016).

Figure 5.5: Historic Painting.
Source: Unknown (Unknown)

Components of the Karoo Farmstead

The farmstead plan results from the arrangement of buildings around open spaces (yards, gardens etc.) and access points.
(Lake & Edwards, Unknown)

5.3.2

1. Outbuildings:

The Karoo farmhouse never stands alone in the landscape, it usually forms part of a larger cluster of buildings, where the surrounding buildings have a more basic character, less ornamentation and are smaller in size.

The farmhouse is usually the centre with the other buildings grouped around it. The outbuildings have a simple plan, usually organised in a very loose, organic manner, dictated by the lie of the land.

This cluster of buildings does, however, form an internal farmyard space, or "werf" for farming and domestic activities.

2. Access:

Access to the farmstead, distinguish between public and private. Some farmsteads may only have a single, private point of access, which constrains the volume of movement to and from the site. Others may stand alongside or sit astride a road or public path or be at a junction of a route giving public access to the centre of the farmstead.

Access to routes and tracks, were introduced for communicating with local markets and communities, carting manure to surrounding farmland, moving livestock (particularly cattle) and bringing harvested hay, corn and other crops to the homestead.

The entrance to the farmstead is usually through a denoted entrance gate flanked by entrance walls leading along a gravel road lined by trees to the welcome of the covered stoep or verandah.

3. Hierarchies:

The house and barn (for storing and processing the corn crop, and sometimes for other functions) are the principal buildings on most farmsteads. The house was either detached from or integrated within the group, with a shared or separate entrance.

The scale, range and form of working buildings reflect their requirements for internal space and plan form, lighting and fittings.

Some buildings were detached and highly specialised in function, such as dovecotes, pigsties and threshing barns. Whilst other buildings were combined for two or more functions.

4. Internal spaces & detail:

The requirements for internal spaces and details were all subject to a huge amount of regional and local variation. Depending on the size and type of farm they are expressed in a variety of built forms and spaces.

5. Working spaces:

Working spaces within and around the farmstead are open areas for moving, storing and managing farm products and animals. For example, cattle yards and areas for stacking corn, hay, timber as well as areas for gardens, orchards, ponds, small field enclosures for milking or sorting sheep and cattle.

Working spaces on the perimeter of a farmstead, including those for stacking corn and other small enclosures, serve to link the outer edges of the farmstead to its surrounding landscape.

6. Yards:

Yards onto which buildings (especially shelter sheds and other stock buildings) face, were used for containing livestock, particularly cattle.

Some farmsteads, especially those that are dispersed in form, are not focused on any single yard area but may have several yards relating to individual buildings or groups of buildings.

To create these yards and a sense of enclosure, rows of trees would be planted. The "werf" wall was also used to create these yards and enclosed spaces.

The presence of trees played an integral part in creating enclosure in the Karoo landscape.

7. 'Werf' walls:

'Werf' walls also known as stone walls would, if soundly built, stand forever. They served the purpose of creating boundaries and a sense of enclosure.

Dry packed walls were sometimes built around arable lands to protect crops from being trampled by sheep and oxen. These enclosures formed a safe haven for protecting livestock from predators such as wild dogs, leopards and hyenas.

Built around a cluster of buildings, 'werf' walls created a boundary for cars and donkey carts.

8. Gardens:

Gardens stand within or to one side of the farmstead. Historically developed as private areas with a distinct and separate character, they may be screened from working areas of the farm by hedges or walls.

Spatial Layout of historic Farmstead

Lanzerac Hotel and Spa

Lanzerac Road, Jonkershoek,
Stellenbosch
1830

33° 56' 18" S
18° 53' 39" E

5.3.3

An investigation into the spatial layout of the historic farmstead typology is done to obtain an understanding of the social meaning of the farmstead, from a tourism point of view.

Despite incremental additions over the years that include a fully functioning modern winery and conference centre, the historic character of the Lanzerac 'werf' core remains essentially unchanged.

The main focus is the spatial layout of the historic farmstead typology to obtain an understanding of the social meaning of the farmstead, from a tourism point of view.

Contextual connection

As a historic landmark the Lanzerac Hotel and Spa is situated on the Lanzerac Road at the entrance to the Jonkershoek Valley, on the outskirts of the town of Stellenbosch, in the Western Cape.

Figure 5.6: Aerial.
Source: Unknown (Unknown)

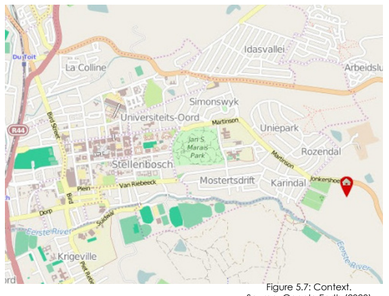


Figure 5.7: Context.
Source: Google Earth (2020)

Figure 5.8: Aerial Survey.
Source: Scoping Report (2015)

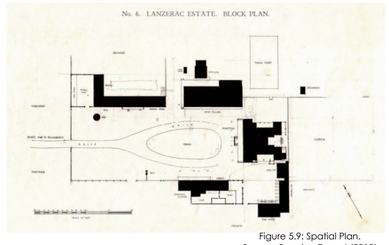


Figure 5.9: Spatial Plan.
Source: Scoping Report (2015)

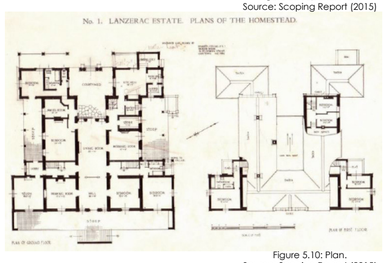


Figure 5.10: Plan.
Source: Scoping Report (2015)

Figure 5.10: 1921-1925.
Source: Scoping Report (2015)

Physical Expression

The Lanzerac 'werf' core is built in the classic Cape Dutch style. The buildings are constructed with local stone to at least window-sill height and then with adobe bricks, finished with mud plaster which is lime washed. The roofs are thatched, and the ceilings made from mud on reed.

The manor house is a single storey U-shaped house with a centre gable. The facades are symmetrical with the central front door, flanked by windows. Newer additions were built with stone walls, brick floors and exposed wooden ceilings. The winery and conference centre, are of a more modern building style.

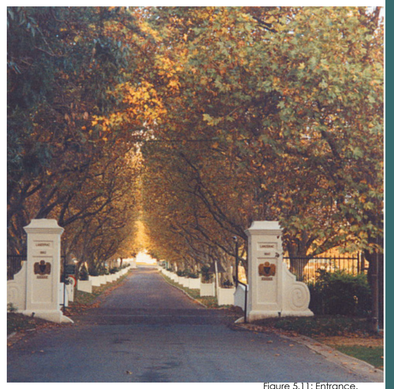


Figure 5.11: Entrance.
Source: Scoping Report (2015)

Figure 5.12: 2020.
Source: Scoping Report (2015)

Spatial Composition

The historic character of the 'werf' core remains essentially unchanged, except for a few additions over the years. The historic core of the complex consists of the following: a gentle sloping entrance that leads to the historic gabled manor house which forms the focus of the 'werf'; the forecourt, in the renaissance layout, in front of the manor house; historic outbuildings that flank the manor house to the north and south and a low 'werf' wall which defines the space.

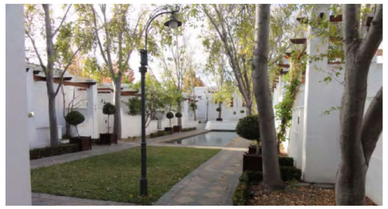
Figure 5.13: Lanzerac hotel complex.
Source: Scoping Report (2015)

The site can be divided into a number of distinctly different character zones.

The Central 'Werf' Precinct (Red: Fig 5.13)
The central 'werf' precinct is a public area that consists of the central 'werf' space, the gabled manor house and the grassed forecourt. This precinct is essentially enclosed and clearly defined by remaining portions of the historic 'werf' wall as well as oak trees on the periphery.

The Eastern Precinct (Pale Red: Figure 5.13)
The area behind the manor house is considered as the eastern precinct. It is a semi-private area with a vast lawned garden, swimming pool and pool house. The precinct has a strongly insular quality due to its dense edges of mature oaks on three sides with the back of the manor house defining the fourth side.

The Northern Precinct (Pale Blue: Fig 5.13)
The northern precinct, where most of the hotel accommodation is located, is the most private part of the complex. Here intimate alleyways link courtyards and guest suites. This area is reminiscent of a small village. This precinct is edged on all sides by either hedges or other buildings, making this area very private. It is regarded as a built environment that looks in on itself.



The Southern Precinct (Pale Pink: Fig 5.13)
The southern precinct is regarded as a semi-private space. The wellness centre, service areas, staff accommodation and garages as well as a vast lawned garden can be found here. This precinct is strongly characterised by heavy concentrations of trees.

Figure 5.14-5.25: Photographs.
Source: Scoping Report (2015)

Conclusion

The focus of the complex is its historic central 'werf' space with the manor house as the main focal point. All other development has been arranged around the central 'werf' space and is connected to this space through a network of alleyways and pathways as well as courtyards.

All of the Lanzerac precincts are clearly separated from one another and have strong positive qualities that are achieved through either high or low walls, or vegetation in the form of hedges or trees.

Comparative MATRIX

5.4

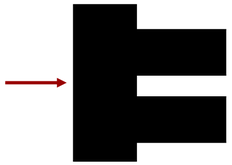
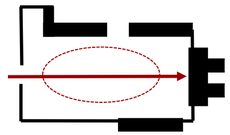
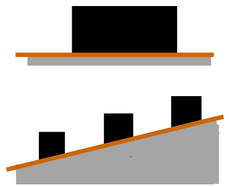
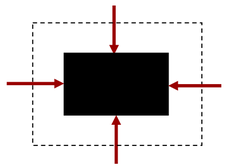
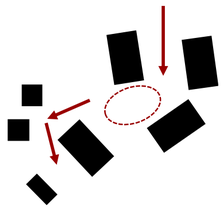
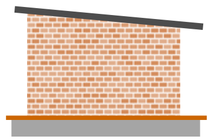
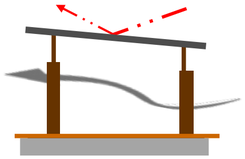
Reason for Precedent	Contextual Integration	Relationship to Context	Plan Type	Access	Techne and Expression	Climatic Approach
Lanzerac Hotel and Spa  	 Buildings are grounded to the earth.	 Dispersed buildings connected by 'werf' walls in rural landscape.	 Historic H-shaped main building entered from the front.	 Entrance is through a courtyard framed by outbuildings.	 Clay brick envelope with thatched roof.	 Heat is reflected from the structure in summer and trapped beneath the roof during winter.
Farmyard layout - Buildings and 'werf' walls.						
Outreach Village School  	 The buildings are grounded to the earth and organized along the slope.	 The composition of buildings is organized as a result of the topography.	 Pure form buildings entered from the exterior.	 Entrance is through a yard framed by buildings.	 Brick envelope with a light metal roof.	 Reflective roof and high thermal mass walls.
Pure forms in an organic composition						

Figure 5.26: Comparative Matrix.
Source: Author (2020)

5.5

The Making of Space

The Making of Space

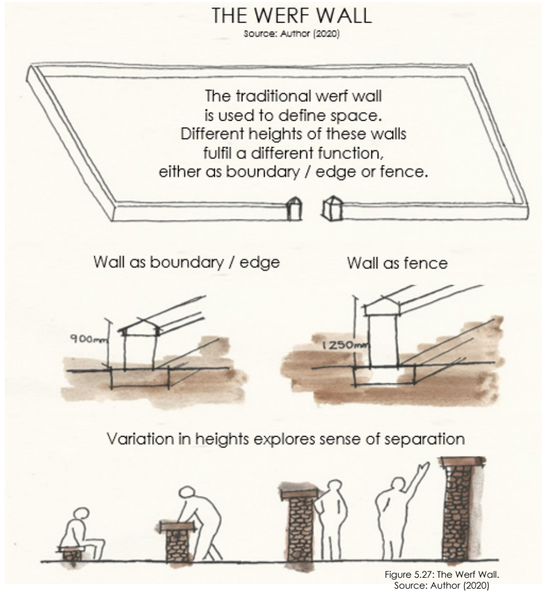


Figure 5.27: The Werf Wall.
Source: Author (2020)

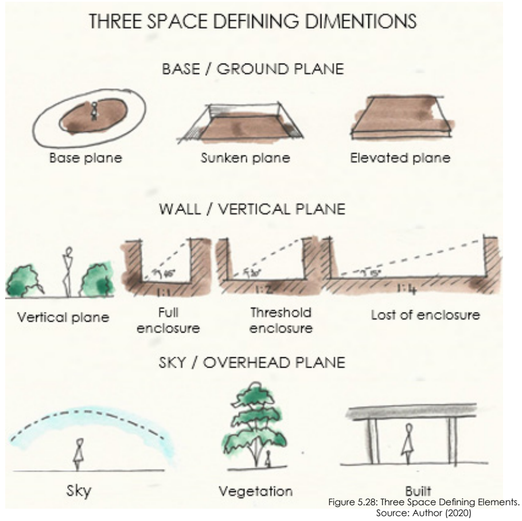


Figure 5.28: Three Space Defining Elements.
Source: Author (2020)

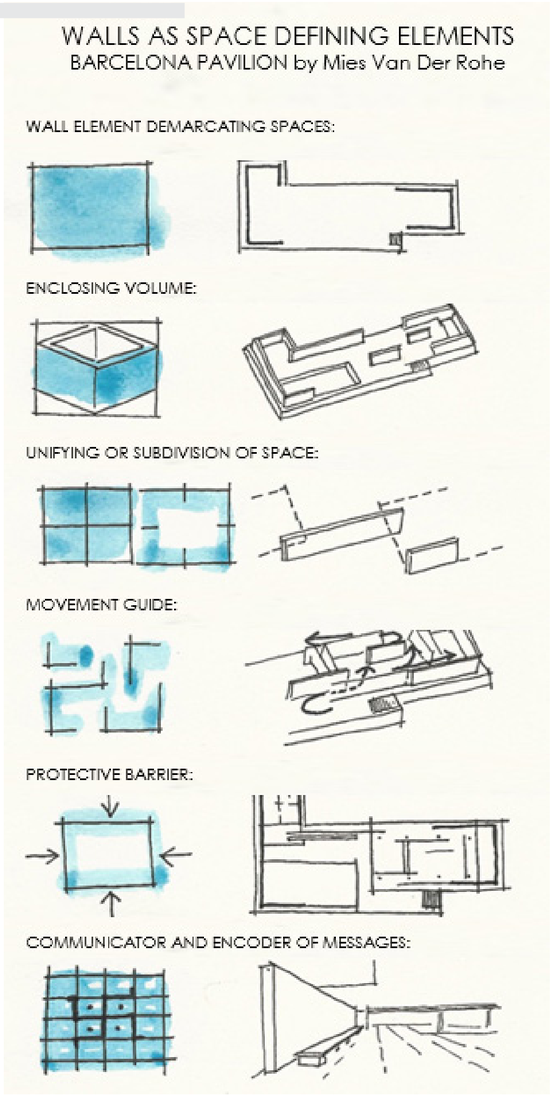
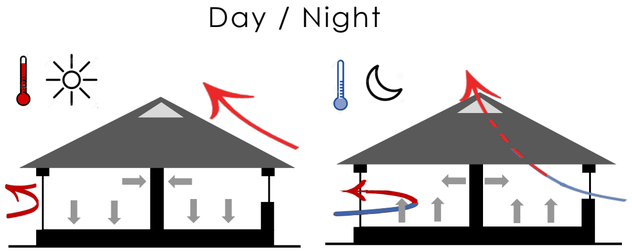


Figure 5.29: Walls.
Source: Author (2020)

Exploration of Relevant Architectural Principals



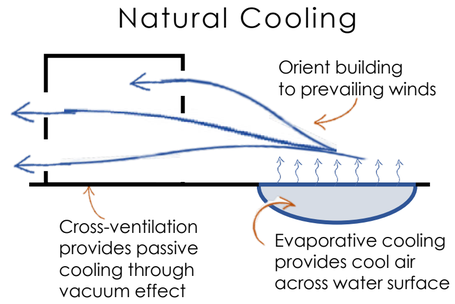


Figure 5.30: Day\Night & Natural Cooling.
Source: Author (2020)

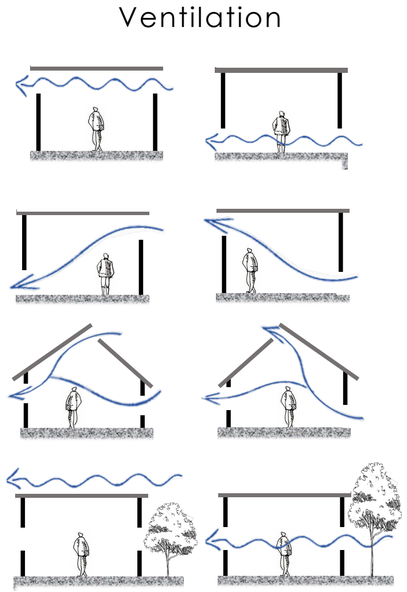


Figure 5.31: Ventilation.
Source: Author (2020)

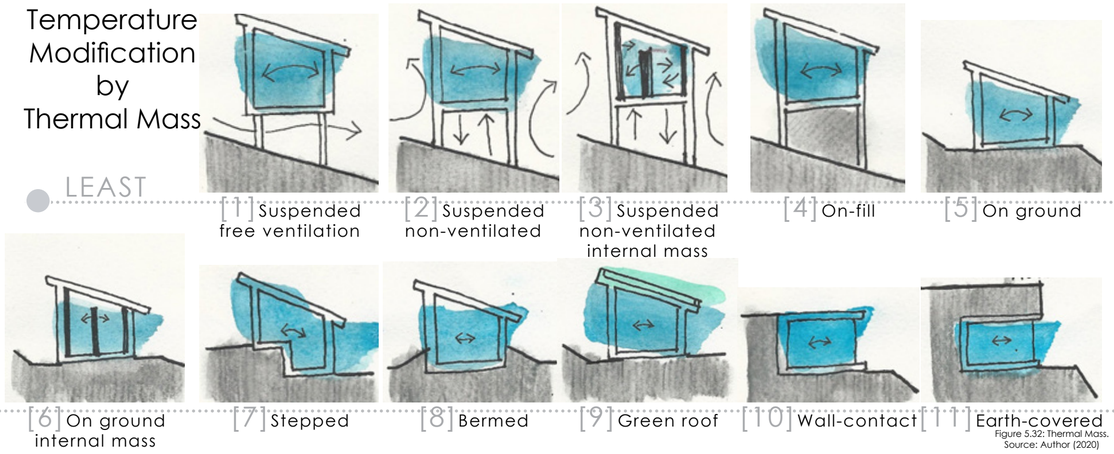


Figure 5.32: Thermal Mass.
Source: Author (2020)

[Connection with the landscape]

Positive & Negative Space as Architectural Concept

5.5.1

"A Pattern Language"
Christopher Alexander

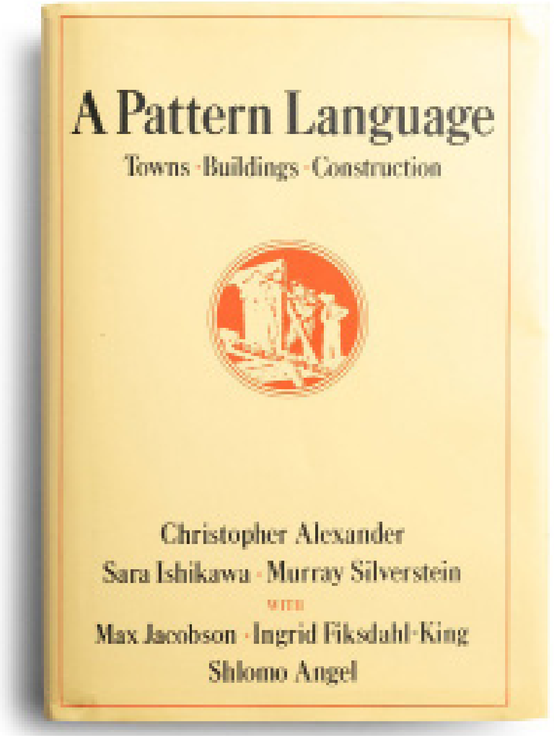


Figure 5.33: Book Cover.
Source: Alexander (1977)

Figure 5.34: Spatial Layout.
Source: Alexander (1977)

When open space is negative, for example, L-shaped-it is always possible to place small buildings, or building projections, or walls in such a way as to break the space into positive pieces.

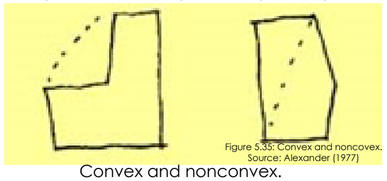


Figure 5.35: Convex and nonconvex.
Source: Alexander (1977)

Convex and nonconvex.

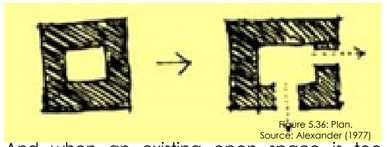


Figure 5.36: Plan.
Source: Alexander (1977)

And when an existing open space is too enclosed, it may be possible to break a hole through the building to open the space up

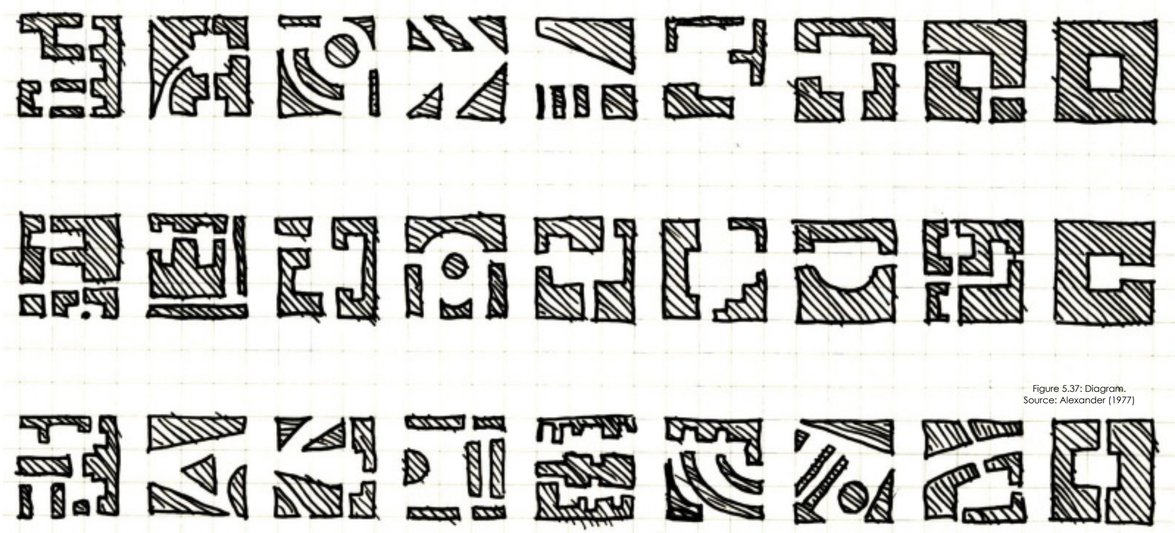


Figure 5.37: Diagram.
Source: Alexander (1977)

Christopher Alexander's book, *A Pattern Language,* investigates principles of design that are based on human and natural considerations. The pattern, # 106 Positive Outdoor Space, refers to space as being "positive" and "negative" and gives suggestions for manipulating outdoor space into more positive space.

The desirability of positive space is rooted in the fact that nature's fundamental closed shape is the circle, or at least some approximation thereof.

Regardless of how far man removes himself from his primitive beginnings, circular shapes remain the most psychologically comforting for human habitation – a fact borne out by the widespread persistence of circular dwellings, from the mud huts to yurts to igloos, despite the fact that they are not necessarily the simplest shapes to construct (Gellner, 2000).

Gellner compare positive versus negative spaces with rolled-out cookie dough, where the cut-out cookies suggest positive spaces and the left-over pieces of dough suggest negative spaces.

In planning, just as in cookie cutting, the main aim is to have as little as possible left-over pieces of dough or negative spaces.

Positive outdoor space has a distinct and definite shape-like cutout cookies. Negative outdoor space is shapeless – like the left-over pieces of dough. Outdoor spaces which are merely "left over" between buildings will, in general, not be used (Alexander, 1977).

Pattern # 106 suggests, giving negative spaces some degree of enclosure, for example surrounding each space with wings of buildings, walls, trees, hedges, fences, arcades, and trellised walks.

When the space stops spilling out indefinitely around corners, it becomes an entity on its own with a positive quality that makes it a positive space.

People feel comfortable in spaces which are "positive" and use these spaces; people feel relatively uncomfortable in spaces which are "negative" and such spaces tend to remain unused (Alexander ,1977).

Another way of defining the difference between "positive" and "negative" outdoor spaces is by their degree of enclosure and their degree of convexity. In mathematics, a space is convex when a inejoininganytwopointsinsidethespaceitself lies totally inside the space. It is nonconvex, when some lines joining two points lie at least partly outside the space. According to this definition, the irregular squarish space is convex and therefore positive; but the L-shaped space is not convex or positive, because the line joining its two end points cuts across the corner and therefore goes outside the space. (See Figure 5.36)

Conclusion

Human beings prefer spaces that have boundaries, as these spaces make us feel safe and reassured. This can also be seen in the animal kingdom. Animals like to hide in spaces that have boundaries. But at the same time, we also do not like feeling too enclosed or too trapped. Positive spaces should be relatively enclosed with a definite and distinctive shape. On the other hand, people feel exposed and vulnerable in leftover open spaces.

5.6

Creating a Sense of Place

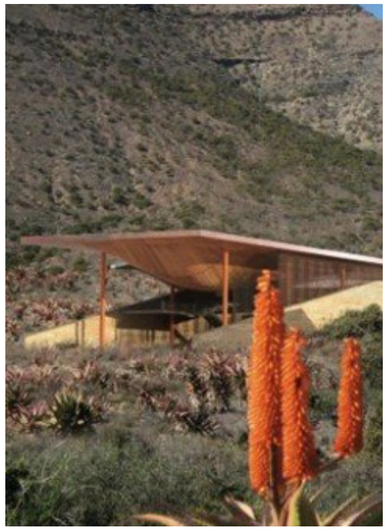
Karoo Wilderness Centre

Karoo, South Africa
Field Architecture

This project is a relevant precedent example for an appropriate and specific design to investigate the climatic conditions and systems for mitigating the effects of adverse weather conditions of the Karoo climate. The Centre is situated in one of the most diverse, isolated places on earth; the Karoo desert in South Africa.

It is a natural resource conservation-and-management centre and a tourist destination. The site is located at the foot of the significant Karoo Mountains that form the backdrop to the building.

This center aims to re-establish the connection between the built and the natural world as it sits in the dominating natural landscape. The building emerges harmoniously from the Karoo context, rather than being a mere a motif on the landscape.



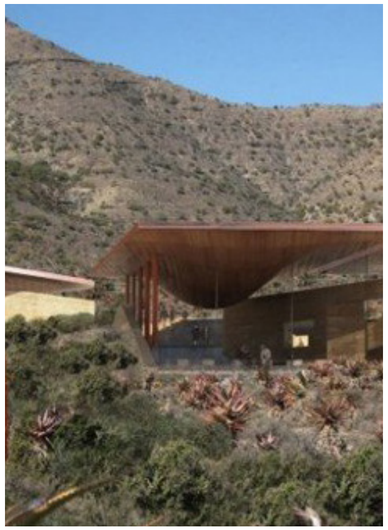


Figure 5.38: Render.
Source: ArchDaily (2020)

Physical Expression

Taking the geography, hydrology, and botany of this arid site into consideration, an off-the-grid facility was designed that generates its own energy, harvests its own water, processes its own waste, and provides thermal comfort using no municipal water or power. The slightly cupped, self-shading leaves of the indigenous Aloe ferox plant were the inspiration for the individual concave-shaped roofs that provide shade to spaces below.

The roofs serve as rainwater capturing systems, mimicking the leaves of the Aloe ferox plant's ability to store water. The upper surfaces of the roofs are used to accommodate photovoltaic cells to produce power for the centre. The undersides of the slightly curved roofs are cladded with thin, curved wooden slats. This defines the cupped form of the roof while imitating the historic reed ceilings of the vernacular houses in the region. An evaporative cooling system for the facility, essential for the hot Karoo summers, is achieved through the funneling of air currents through the slightly cupped roof construction. The unique roof design also serves as part of a radiant hydronic heating system in winter.

The concrete walls, built from local materials, provide the necessary earth retention as well as thermal mass. The walls highlight the colors and geology of the surrounding landscape.

Spatial Composition

The access path brings visitors to the main area of the facility that includes an arrival lobby, a reception office and lounge, and dining room and kitchen. This area forms the first part of three clusters of spaces of the facility. The second cluster of the facility includes a library, a conference room, a theatre and an outdoor classroom.

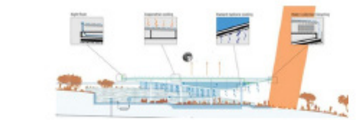
A row of seven residential rooms form the third cluster. Huge windows adorn each space and highlight the dramatic views of the Karoo. Covered outdoor terraces and pedestrian paths connecting enclosed spaces were designed to accentuate the arid landscape and invite the great outdoors inside.

Conclusion

In the design of the Karoo Wilderness Centre, the architect took the harsh Karoo climatic conditions into consideration and responded to the delicate nature of the region. The design employed the use of local materials, thermal massing and rainwater capturing systems.

Already proven methods were used and further developed in this harsh environment. The emergent condition comes through very strongly and shows respect for nature. Allowing for a comfortable building in less than comfortable conditions (Shareefah, 2017).

Figure 5.39: Plan.
Source: ArchDaily (2020)



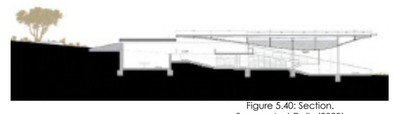


Figure 5.40: Section.
Source: ArchDaily (2020)

Fallingwater

Frank Lloyd Wright

> **"No house should ever be on a hill or on anything. It should be of the hill. Belonging to it. Hill and house should live together each the happier for the other."**
> -Frank Lloyd Wright

Figure 5.41: Fallingwater.
Source: Fawcett (2017)

5.6.2

Contextual connection

The Kaufman House, or Fallingwater as it is commonly known, is built on an outcrop of rock over a waterfall on the Bear Run Creek, in the Pennsylvanian forest. Fallingwater's most notorious aspect of design is the remarkable interconnection between building and site. As the design was based on the theory of organic architecture, where the design of buildings is directly informed by the qualities of their sites, Frank Lloyd Wright decided to make the waterfall part of the house.

It is said that Wright was not interested in a typical site that overlooked the waterfall, instead he made the waterfall the site and built the house partly over the waterfall on Bear Run stream. Wright stated: "the visit to the waterfall in the woods stays with me and a domicile takes shape in my mind to the music of the stream". Wright blurred the boundaries between interior and exterior.

This can be seen on the south-southeast orientation, where the impression given is that the stream flows directly through the house, not alongside as it, as it actually does. A bridge across Bear Run Creek leads visitors to the front door. The architect truly trapped the outside world into this building.

The concept of organic architecture and Wright's belief that human life is part of nature also manifested indoors, where he united the house with the earth. This was achieved through a rock outcrop that projected above the living room floor into a massive central hearth.

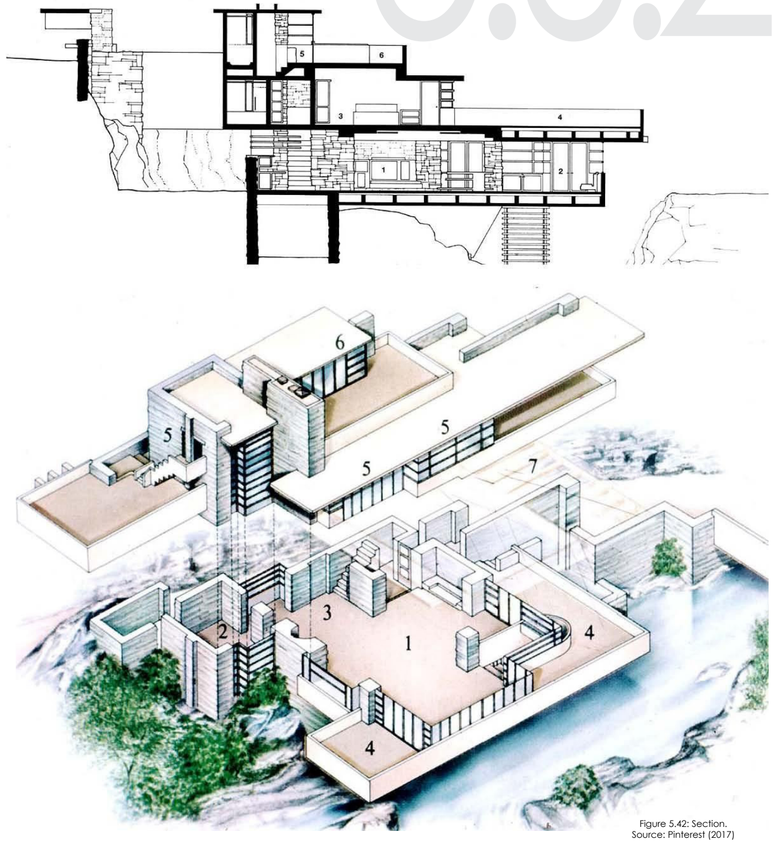


Figure 5.42: Section.
Source: Pinterest (2017)

Physical Expression

The connection with nature was conceived through the design of the house without walls facing the falls, except a central stone core for the fireplaces and stone columns. Instead of walls, glass, in the form of corner windows were used to maximise the vistas of the horizon and woods. A kind of trap door leads to the water below.

Spatial Composition

The house consists of three concrete floors that cantilever over the waterfall. Some balconies project 17ft over and 62ft along the waterfall.

The plan layout could be confused with the elevations and sections because they look very similar to the square geometric shapes.

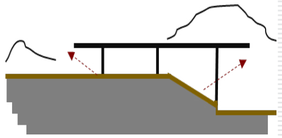
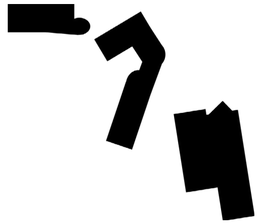
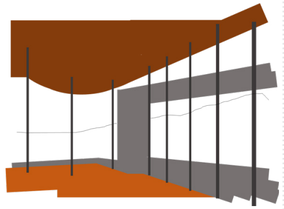
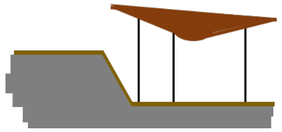
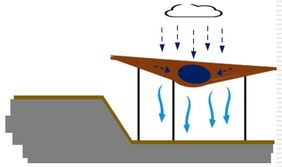
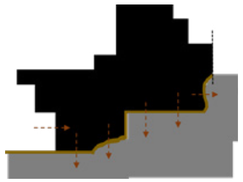
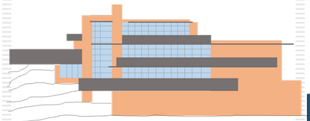
Conclusion

Fallingwater is a brilliant example of reconnecting people with nature through architectural design. Wright did not isolate nature from design but made nature the main focus of his design that allowed the occupants to live with nature and not just look at it. We should all aspire to create places that understand and effectively respond to both the built and the natural (Hough, 2014).

Comparative MATRIX

5.6.3

[Connection with Landscape & Climatic Approach]

Reason for Precedent	Contextual Integration	Spatial Relationship	Techne and Expression	Relationship to water	Climatic Approach
Hendrik's Gin Palace & Distillery					
Management of rainwater in semi-arid climate.					
Building is expressed as growing from the earth with a light weight construction roof.		Dispersed building complex in rural landscape.	Concrete frame with lightweight wooden roof construction.	The water harvesting system and the building become one entity.	Rainwater is collected on the roof and used to cool the building during hot season.
Milagrito Mezcal Pavilion					
Building's relationship to earth and water.					
Building is grounded to the earth and organised along a hill.		Interlocked building in rural landscape.	Concrete, stone and glass.	Building is partly built over a waterfall.	Water vapour cools building.

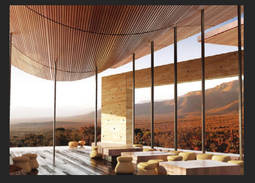


Figure 5.43: Comparative Matrix.
Source: Author (2020)

5.7

Working With a Grid

Space Caught in the Net of Order

[grid]

The grid is much like syntax in language. It is a rigid established framework in which semantics can happen. Using a grid system like that is not only good for harmonious purposes but is also a useful tool for expressing design rules within a layout.

Used on a smaller scale, a grid allows for internal transformation. For example, a balcony established in the right grid can become a room. On a larger scale, using a grid allows for the sensible and logical extension of architecture.

If used on an even larger scale, a grid sets the rule for possible connections between buildings. All these happen on two folds: structural planning and spatial planning. (Ling Lim, 2015)

WHAT IS A GRID

Structural grid, modular grid:
a regular frame-work of reference lines to which the dimensions of major structural components of the plan of a building are fixed. In town planning, a checker-board network of intersecting streets and avenues forms the basic layout of a city or town.

Definition:
A **Grid Line**
Is one of the lines marking a structural, modular or layout grid of a building, to which dimensions are coordinated.

Definition:
Grid Plan
An urban plan type in which streets are laid out in an orthogonal network, forming a pattern of approximately rectangular blocks; also called a checkerboard

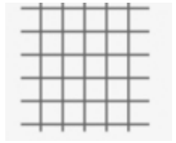
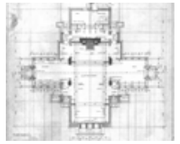
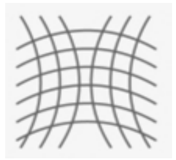
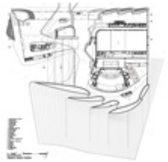
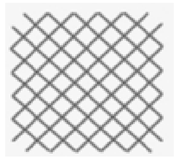
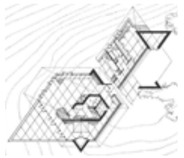
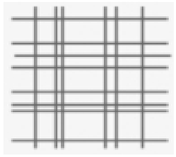
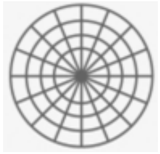
GRID PATTERNS	GRID PATTERN ARCHITECTURE	
 REGULAR	Coonley Playhouse, Illinois Frank Lloyd Wright	
 ORGANIC	Heydar Aliyev Center, Azerbaijan Zaha Hadid Architects	
 ANGLED	Berger House, California Frank Lloyd Wright	
 IRREGULAR	Vitra Design Museum, Germany Frank Gehry	
 CIRCULAR	Guggenheim Museum, New York Frank Lloyd Wright	

Figure 5.44: Grid Patterns & Architecture.
Source: Author (2020)

[on the Wright lines]

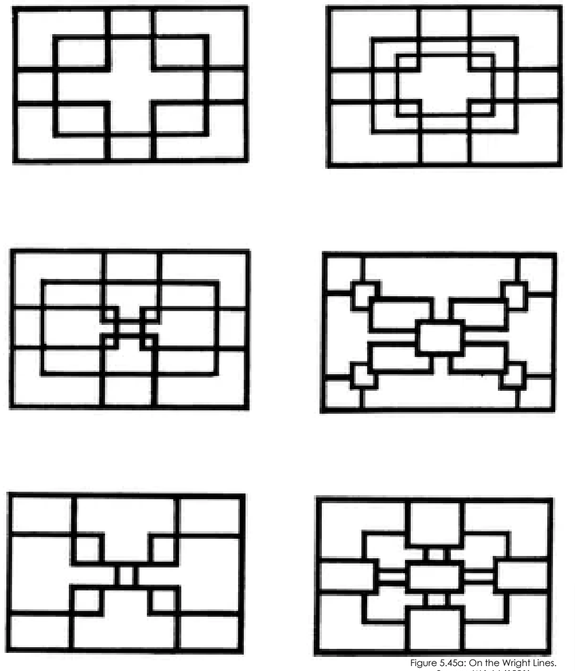


Figure 5.45a: On the Wright Lines.
Source: Wright (1991)

5.7.1

FRANK LLOYD WRIGHT AND ARTHUR DOW'S INTELOCKING LINES

In Dow's interlocking line-ideas, it seems that Wright may have found the basis for several of his first genuinely 'organic' plans, and in the process, possibly the inspiration for the overlapping spaces and open-cornered forms which came to characterise his mature work.

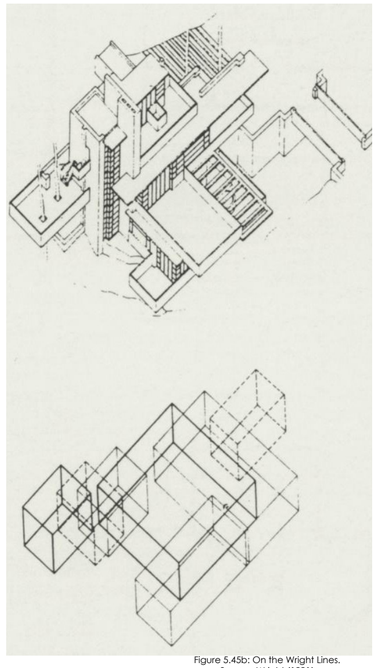


Figure 5.45b: On the Wright Lines.
Source: Wright (1991)

5.7.2

Organisational Patterns

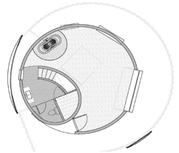
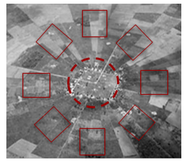
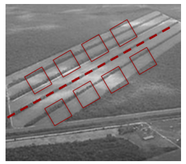
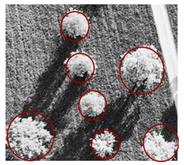
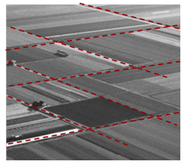
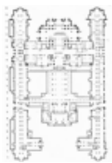
VEGETATION	TOWNS	ARCHITECTURE
 Centralised	 Essen, Germany	 Treewow Retreat, China Monoarchi Architects
 Radial	 The Garden City	 Syd Energi HQ, Denmark GPP Arkitekter
 Linear	 Soria, Spain	 Linear House, Australia Architects EAT
 Cluster	 Informal housing	 Casa Bruma, Mexico Canales & Rodrigues
 Grid	 Cape Town Station	 Imperial Hotel, Tokyo Frank Lloyd Wright

Figure 5.46: Organisational Patterns.
Source: Author (2020)

Diagrammatic examples of how villages grew and developed:

a. Steady growth from a single farmstead

b. Agglomeration of several centres.

c. Collapse of a dispersed settlement into a planned one.

d. Conscious planning as a new foundation.

The Pattern of buildings:
The structure and style of the buildings constructed in the landscape developed in a similar way to the field or village patterns arising from the interaction of people's activities with the landform, ecosystem and climate (Bell, 1999).

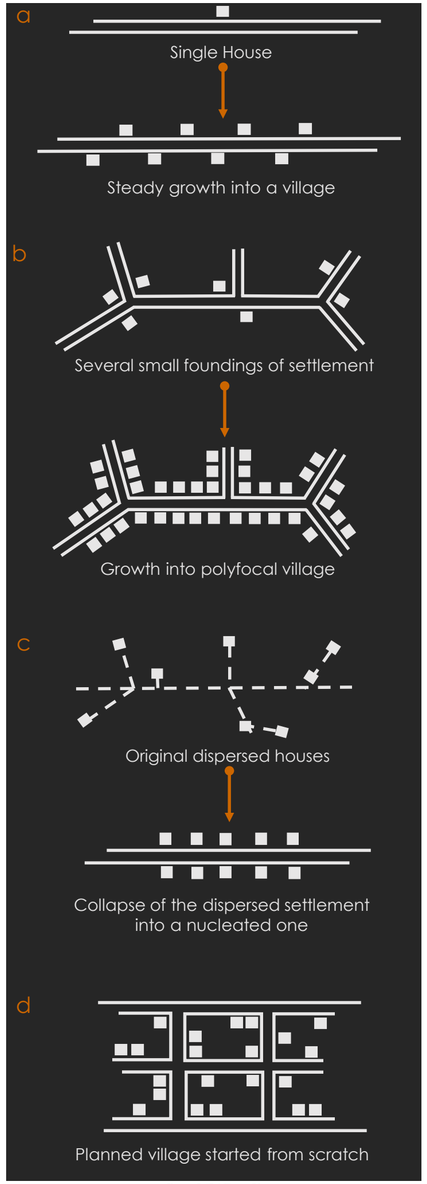
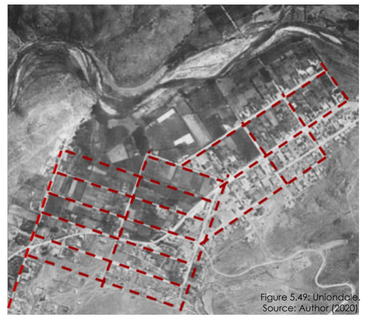


Figure 5.47: Village Diagrams.
Source: Author (2020)

The Little Karoo Urban Grid


Ladismith, Little Karoo


Uniondale, Little Karoo


Amalienstein Mission Sation/Farm, Little Karoo

Figure 5.50: Amalienstein.
Source: Author (2020)

5.8

Sustainability Analysis & Process of Agave Production

Figure 5.51: Agave Types.
Source: Hunters (2019)

[Background]

Food production is done in many different types of agricultural production systems worldwide. The main difference between the agricultural production systems is whether it is intensive or extensive. Looking at these two systems in Mexico, the agave production has been developed in two different ways.

Firstly, agave for the production of tequila has been farmed in capital, but not labour intensive operations. As a result, surrounding local communities have been negatively impacted. Secondly, agave for the production of mezcal has been produced in extensive systems within a subsistence peasant culture. The main production system is harvesting wild agave from their own and neighbouring farms, although in very low yields. Such subsistence farming is compatible with the environment of the area and benefits the local community in alignment with the peasant culture.

This part of the chapter aims to study which agave production system can improve the community's livelihood by achieving a sustainable rural development which contributes to the earth in a positive way. Agave-based agroforestry must be implemented in a sustainable and organic way and the production system must complement the peasant subsistence culture.

Looking at a rural South African, Karoo context there are four potential solutions:
-Firstly, implement agave crops in poor, unused agricultural land on the Amalienstein farm. Agave plants prefer rocky or sandy soil. It is not particular about soil pH.
-Secondly, adapt to agave-based agroforestry, with acacia as the nitrogen-fixing companion tree.
-Thirdly, go organic like the small scale farmers already do, as Zoar and Amalientein is ideally situated for organic agriculture.
-Fourthly, change part of the forest (agave-based agroforestry) into a seed spreading system (high density system).

5.8.1 Transition from Extensive to Intensive Agricultural Systems to a Hybrid

Over time, there has been a transition from extensive to intensive agriculture in order to improve and increase food and product production. In many regions, especially in the rural Karoo, agriculture is still produced in extensive systems within a peasant subsistence culture. There is a huge difference between these two systems; not only in environmental and social consequences, but in the production outcome.

Agricultural yields are related to the amount of input used to produce a particular crop, in this case agave. The inputs in extensive systems are usually low use of machinery, fertilisers, pesticides, irrigation and high labour involvement with typically low yields. To intensify the system, labour is changed from human power to animal power and, eventually with time to machinery; therefore, machinery is increased, and human labor is reduced. The system becomes labour efficient. To increase the crops' productivity more pesticides, fertilisers and irrigation are used. This intensive system can achieve higher yields.

The large use of inputs implies higher energy use with the intensive system. The energy use includes the fuel for the machinery, irrigation as well as the large indirect energy used to produce fertilisers and pesticides. Usually in extensive systems the energy efficiency is higher than in intensive systems, as well as its smaller carbon footprint, compared to the intensive system's energy consumption. In an extensive system less energy is required to produce a certain amount of yield than in an intensive system. Extensive systems reduce the negative effects per crop of the use of fossil fuels for global warming as well as water, noise, soil and air pollution.

Extensive systems require more land to produce a certain yield and the efficiency of landuse is lower than in intensive systems. In the rural context this is not a problem as there are large areas of poor agricultural land that is under utilised.

Agave-based agroforestry, is a fairly new typology of agriculture that finds itself between extensive and intensive agriculture.

The low usage of machinery, fertilisers, pesticides, irrigation and high labour requirements are extensive while the high output per unit of area is intensive. The location of Zoar and Amalienstein's is ideally for organic agave production as several mountain ranges separate the land to prevent agrichemical and cross-pollination from neighbouring non-organic farms.

Figure 5.52: Agave Fields
Source: Unknown (2014)

Figure 5.53: Agave Types
Source: Hunters (2019)

5.8.2 The Agave Crop

Agave is ideal for arid and hot climates as it requires little or no irrigation to survive and thrive and is basically impervious to rising global temperatures and drought. Agaves have an optimum development in rocky soils and open areas with a lot of sun.

If they grow in poor soil with little sun, they will be small taking longer to reach maturity. They are green throughout the year, and their sword-shaped leaves which retain water are adapted to desert conditions to retain moisture.

Agave reaches maturity around the age of 6 to 14 years. The central leaves become thinner with a large inflorescence of 3 - 6 meters tall. Flowers bloom on small branches which grow on the inflorescence.

It is also called the century plant, as it blooms just once in its life and die after blooming. Agaves are self-incompatible therefore pollinators are fundamental for the fecundation of the flowers.

The main daytime pollinators are bees, pollen wasps, ants, birds (hummingbirds), butterflies and flower beetles. The night pollinators are bats and moths. Agaves have high ecological importance because many of them are key species.

They produce large quantities of resources during their reproduction such as flowers, pollen and nectar. Many animals depend on these, especially pollinators, which are important for the ecosystem. Agave is relatively cheap and easy to produce and cultivate with one plant producing as many as one million new pups (baby plants).

Within three years after planting agave, farmers may begin pruning the leaves or pencas of the agave. From eight to ten years the root stem or pina is ready for harvesting. Agave may be harvested annually.

As climate change leads to warmer, drier and even drought conditions in semi-arid regions, growing resource-intensive crops will become more challenging for the farmers. Such crops will be subjected to increased frequency and intensity of drought and heat stress.

Highly productive plants like agaves will respond favourably to global warming, both in natural and cultivated settings. Agave is one of the top ten best drought tolerant plants.

With nearly 250 species, agaves have evolved traits, including crassulacean acid metabolism (CAM), which is a photosynthetic pathway enabling these plants to draw moisture from the air and store it in their thick, tough leaves at night. The openings in their leaves close up during daylight hours, drastically reducing evaporation. Its shallow mycorrhizae fungi-powered roots spread out horizontally, taking in available moisture and nutrients from the topsoil, especially during the rainy season.

Agave is a self-reproducing perennial with pups growing out of its horizontal roots, which can be removed with a sharp knife and planted elsewhere. Even at the end of the agave's lifespan it leaves behind a family of pups that are carrying out photosynthesis and producing biomass at an equal or greater rate than the plant-parent.

5.8.3 Agave Farming for Animal Fodder & other Products

Agave produces more above ground and below ground biomass (and animal fodder) on a continuous year-to-year basis than any other desert and semi-desert species. Farmers had not been able, until recently, to figure out how to utilise the massive biomass of the agave plant leaves which is basically indigestible and even harmful to livestock. Animals typically will not, unless starving, eat the agave leaves with its thick skins and thorns.

When the agaves are three years old and for the following five to seven years, farmers can begin pruning the leaves or pencas, chopping them up finely with a relatively simple machine, hooked up to a tractor.

The next step is to anaerobically ferment the biomass in a closed container. The fermented end-product, after 30 days, provides a nutritious but very inexpensive silage or animal fodder.

Agave leaves, a heretofore indigestible massive and accessible source of biomass, is now turned into a valuable animal feed, using the natural process of fermentation to transform the plants' indigestible saponin and lectin compounds into digestible carbohydrates and fibre.

Agave silage could potentially make the difference between survival and bankruptcy for millions of the world's small farmers and herders (Cummins, 2020).

The bountiful harvest of this regenerative, high-biomass, high carbon-sequestering system will eventually include not only extremely low-cost, nutritious animal silage, but also high-quality organic lamb, mutton, cheese, milk, aquamiel (agave sap), pulque (a mildly alcoholic beverage) and distilled agave liquor (mescal), all produced organically and biodynamically with no synthetic chemicals or pesticides whatsoever, at affordable prices, with excess agave biomass and fibre available for textiles, compost, biochar, and construction materials (Cummins, 2020).

The sugar (almost entirely fructose) content in some agave species is quite high reaching as much as one third of the weight of the stem and even leaves have some of it (Kant, 2010).

The agave plant's flowers, and the flower stem grow tall and strong by adding lignin to the stem fibres. After flowering and drying, the stem is a preferred raw material for musical instruments ranging from large drums to the more discreet flutes.

It has also proved to be an excellent crop for bioethanol since it addresses two of the main concerns in using sugarcane, that of threatening food security by using fertile lands and consuming very high quantities of water.

5.8.4 Agroforestry

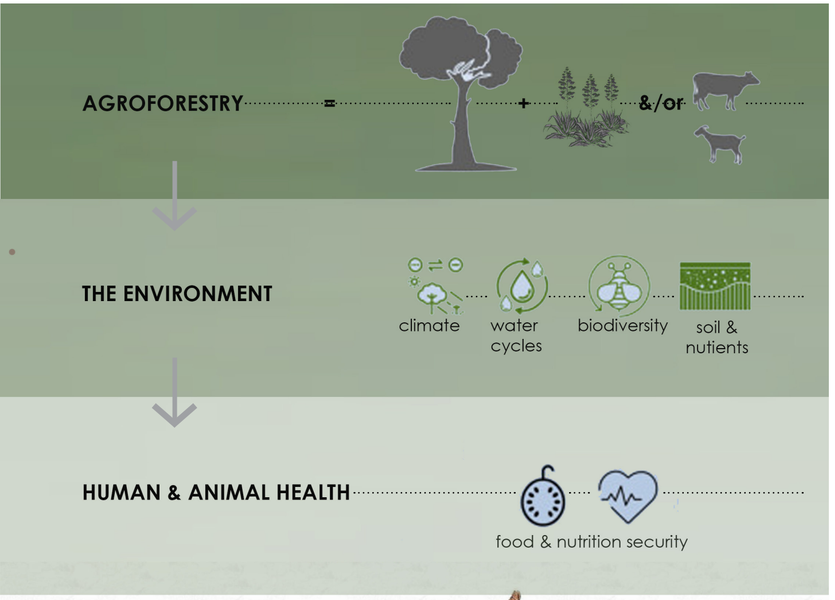


Figure 5.54: Agroforestry
Source: Author (2020)

BENEFITS OF AGROFORESTRY SYSTEMS:

Climate change mitigation
Economic
Animal welfare
Production
Sustainability
Landscape
Environmental
Social

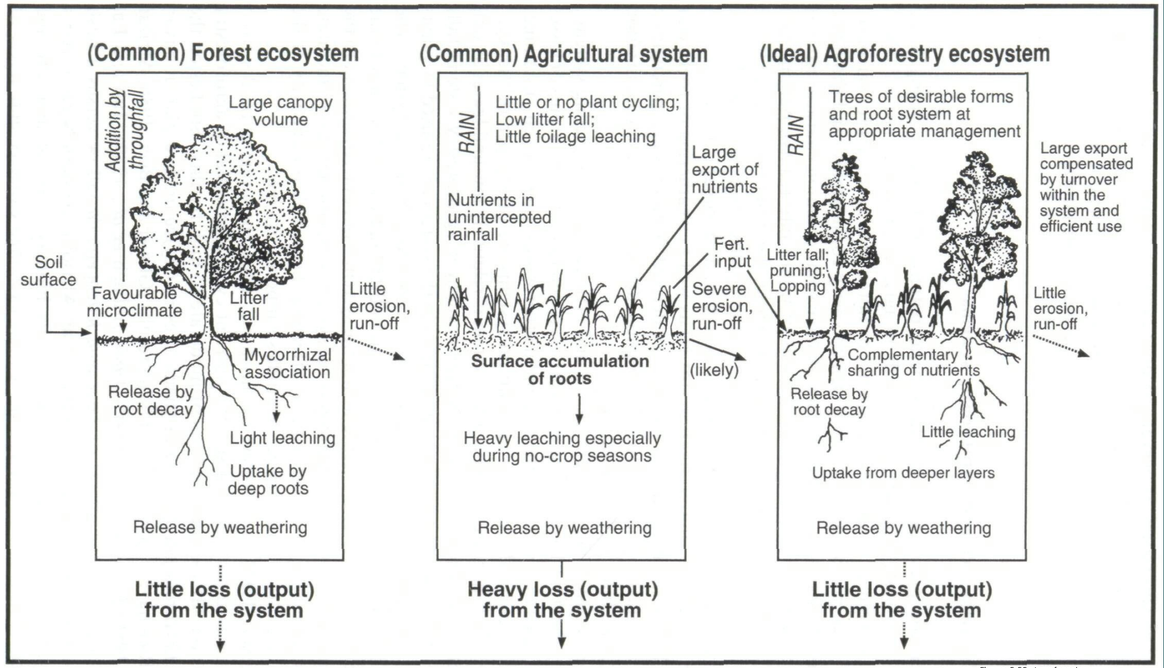
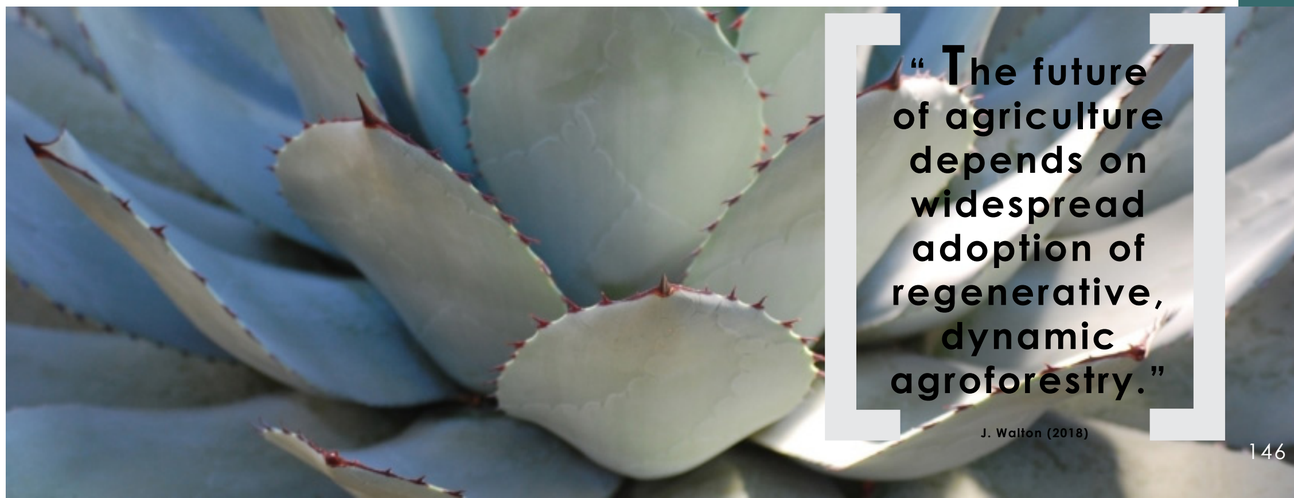


Figure 5.55: Agroforestry
Source: Pinterest (2020)



" The future of agriculture depends on widespread adoption of regenerative, dynamic agroforestry."

J. Walton (2018)

Agave-Based Agroforestry

The typology of agave-based agroforestry is investigated to get a better understanding of the financial profitability of agroforestry practices in community-based programmes, as well as its advantages as a key tool for combatting hunger and climate change.

It is clear that for making a meaningful progress in checking the continuous rise in the global temperatures removing carbon dioxide from the atmosphere would be at least as important as reducing its emission. But capturing atmospheric carbon dioxide and sequestering it in the vegetation is limited by the availability of land and the lack of water poses an even greater problem (Kant, 2010).

The advantages of agave-based agroforestry are abundant. Agave plants and nitrogen-fixing trees densely intercropped and cultivated together have the capacity to draw down massive amounts of CO2 (30-60 tons of CO2 per hectare) from the atmosphere per year. In other words, a very high level of above ground carbon storage and below ground sequestration can be maintained year after year to fight global warming.

Nitrogen-fixing trees have the capacity to convert the atmospheric gas, nitrogen, into usable compounds for their own purpose and to add it to the soil. Nitrogen-fixing trees include the Acacia karroo (Soetdoring), a well-known tree in the Klein Karoo. No synthetic fertilisers or chemicals are required in agave agroforestry if agave plants are intercropped in conjunction with nitrogen-fixing trees.

Agave is to the drier parts of the world what bamboo is to its wetter zones. Capturing atmospheric CO2 in vegetation is severely limited by the availability of land and water. The best choice would be species that can utilise lands unfit for food production and yet make the dynamics of carbon sequestration faster.

As much as 40% of the land on earth is arid and semi-arid, largely in the tropics but also in the cool temperate zones up north. And on almost half of these lands, with a minimum annual rainfall of about 250 mm and soils that are slightly refractory, the very valuable species of agave grows reasonably well (Kant, 2010).

Farmers in these arid and semi-arid areas face tremendous challenges because of increasing droughts, erratic rainfall, degraded soils, overgrazed pastures, and water scarcity. Poverty, unemployment, and malnutrition in these degraded landscapes are rampant, giving rise to violence, organised crime, and forced migration (Cummins, 2020).

Agave by itself would not constitute a tree crop and thus cannot provide the minimum crown cover of 10% (or the value chosen by the host country) by itself in order to create a forest over a non-forest land as required under specific rules. But if the minimum required crown cover is created by planting an adequate number of some other suitable tree species in the agave plantation then the carbon sequestered in the agave plants will also be eligible for measurement as above ground dry biomass and thus provide handsome carbon credits (Kant, 2010).

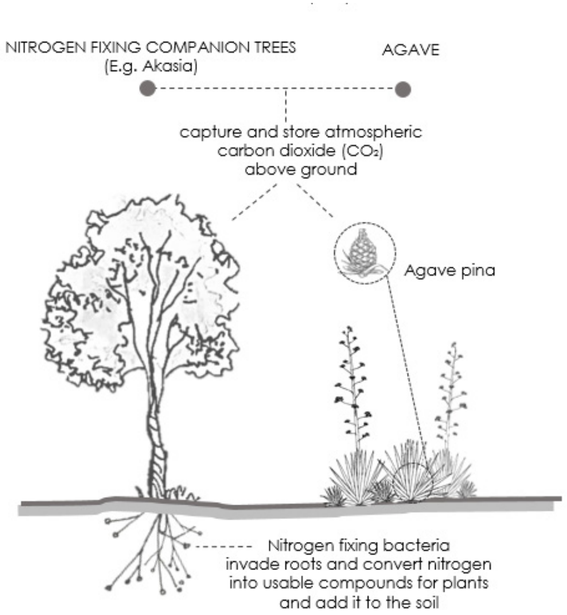


Figure 5.56: Agave-based Agroforestry
Source: Author (2020)

The Regenerative Power of Agave

YouTube Video

Link: https://youtu.be/ewoPIVVmcSs

5.8.5

Figure 5.57: Mexico
Source: Casas, Rendon & Vazquez (2019)

5.8.6

Types of Mezcal Production

An in-depth study of the mezcal production process, from raw material to the final product, provides an understanding of the manufacturing processes and the engineers' role in the processing typology with a particular interest in the stages of the meszal / agave production archetype.

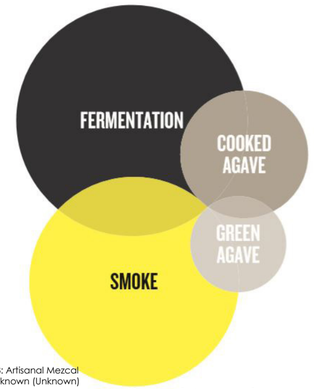


Figure 5.58: Artisanal Mezcal
Source: Unknown (Unknown)

Artisanal Mezcal

It is described as having high flavour complexity with well-defined notes of smoke, ripened fruit and acetone.

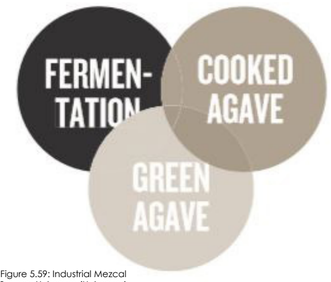


Figure 5.59: Industrial Mezcal
Source: Unknown (Unknown)

Industrial Mezcal

It uses diffuser and column distillation technology. It has poor expression in terms of complexity and intensity. It is common to use flavour agents and a secondary source of sugar. In this type of mezcal, smoke cannot be found as the cooking process involves pressurised steam.

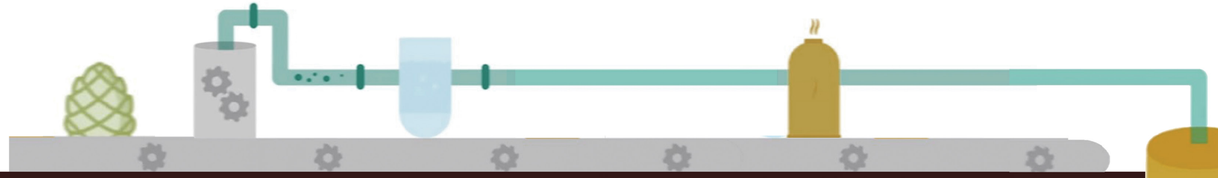
ARTISANAL MEZCAL		INDUSTRIAL MEZCAL	
AGAVE Mainly espadín and other wild and semi-cultivated varieties.			**RAW MATERIAL** Monocultivated blue agave or espadín. Sometimes combined with other sources of sugar (Mixto)
COOKING Ground oven, heated using pine or oak wood			**COOKING AND JUICE EXTRACTION** Juices are first extracted with a diffuser and then cooked using a high-pressure autoclave.
GRINDING Tahona mill pulled by a mule or similar animal			
FERMENTATION Wood vats, fibers are included during fermentation			**FERMENTATION** Large stainless steel vats between 20 and 100 kiloliters.
DISTILLATION Copper still, double distillation			**DISTILLATION** Column distillation performed in one or two steps
			**ADDED PROCESSES** Added flavors are commonly used. They can be subjected to aging.

Figure 5.60: Comparison
Source: Author (2020)

5.8.7

Products made of agave

MEDISINAL & PRODUCTS
- Anti-inflammatory
- Antiseptic
- Soaps
- Sunscreen
- Hair treatment
- Detergents
- Bug repellent
- Toothache



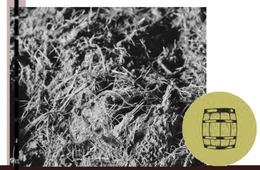
AGAVE SYRUP
- Juice extracted from pina
- Juice is filtered
- Heated to break the complex components into simple sugars
- Final product

MEZCAL
- Agave & Nitrogen fixing companion trees
- Harvesting of raw material and cutting off the leaves
- Transporting from field
- Chopping smaller
- Cooking of agave stems in pit oven (3-5 days)
- Milling or crushing of cooked agave stem pieces
- Fermentation of cooked agave juice in fiber
- Distillation of fermented agave musts
- Bottling
- Final product











LEFTOVER FIBERS
- Biodegradable plastic bags & Straws
- Paper
- Planting pots
- Packaging
- Bottles

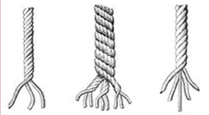




SISAL FIBER
- Binding
- Extraction of fiber
- Fiber pressure water
- Airing
- Rope making
- Sisal fiber rope








HAND CRAFTS

FODDER CROP
- Leaves chopped finely
- Fermentation
- Fodder crop


BIOFUELS & FERTILIZERS

BUILDING MATERIALS

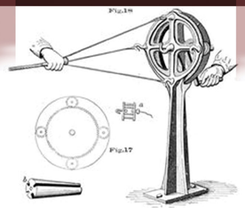
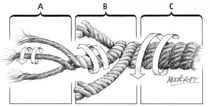



Figure 5.61: Process
Source: Author (2020)

5.9 Summation

Through the investigation of an agave-based agroforestry it may be seen that this type of agricultural method is a key tool for combatting hunger and climate change. The artisanal production type of agave products is a small-scale venture which suits the community programme better in terms of employment opportunities.

An investigation into the spatial layout of the historic farmstead typology, as well as the positive and negative space as architectural concept, was done, as the site is closely connected to the historic core of the Amalienstein farmstead.

To understand the design's response to the arid landscape and climate of the Little Karoo, precedents were investigated to gain a better understanding of the micro climatic conditions and systems for mitigating the effects of adverse weather conditions of the local climate.

Grids are natural extensions of the order which organise influencing elements around and on the site. The grid helps the audience predict where elements and information will be on the site, making it easier to navigate.

Grids are tools for organising space, text, images, and any other element placed in a design. Grids add structure to a design. It is important to not just design with the grid, but to design the grid.

B

part b

DESIGN

Part A dealt with the researt component to this dessertation, where Part B deals with design component.

Part B aims to project a rooted knowledge generated through the critical analysis and research undergone as presented in part A.

The final design will regenerate the degrated rural landscape, by starting on a proposed urban framework scale and then zooming in to a presinct scale with the end goal to strengthen the form, structure, space and performance of the rural settlements.

The design is communicated through referencing the accompanying brief and accommodation schedule.

The design exploration and development will be generated throughout the continuum of the cyclical design process.

The final proposed design response will be presented as a set of drawings, diagrams, models and renders which underline the thought process and intent.

PROPOSED URBAN FRAMEWORK

Ch. 06

[part] B

6.0

Introduction

General Information & Chapter Outline:

The following chapter explores the spatial and physical development through the design of a spatial development framework for the urban and natural environment surrounding the design of a 'padstal'. Thinking across scales is a fundamental conceptual starting point that was covered in Chapter 3, with decisions taken at larger scales providing the first level of 'fix' for all scales below.

This chapter is the response to the theoretical and physical frameworks established in previous chapters. It oncludes with defining a vision for this rural degraded landscape.

A synthesis of the analysis will be developed in diagrammatic form in order to develop a 'vision' statement for the future development of Zoar and Amalienstein. The vision statement will ask "What should be?". This will consider the current development issues and develop a notion of what the urban development should look like in the future.

Different Rural Settlement Forms:

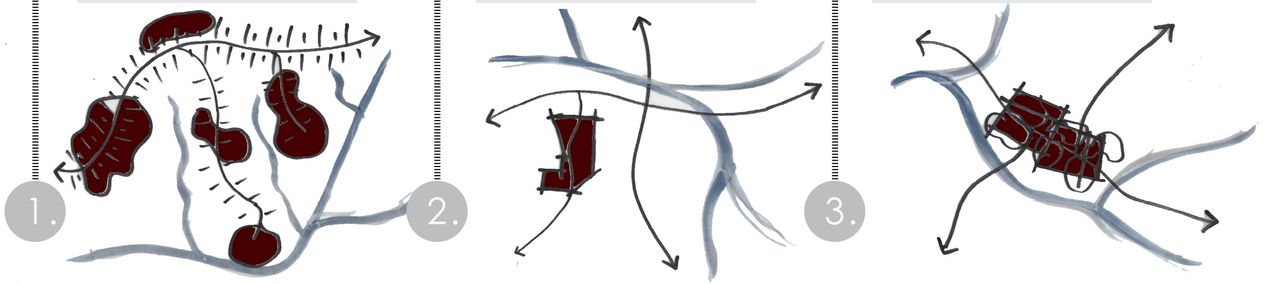
6.1

Commonly found rural settlement forms in the South African countryside:

1. Sprawling, fragmented and very low density pockets of settlements.

2. A conventional small town or village found in commercial farming areas.

3. A cluster of facilities but with very little permanent population (this usually happens when people are prevented from occupying the land, for example, on private farms).



Map of Zoar & Amalienstein:

Zoar & Amalienstein falls under the first category of rural settlement forms.

The layout of the settlements are based upon the topography wich results in fragmented and low density pockets of built grain.

There are clusters of houses along the rivers and flat plains.

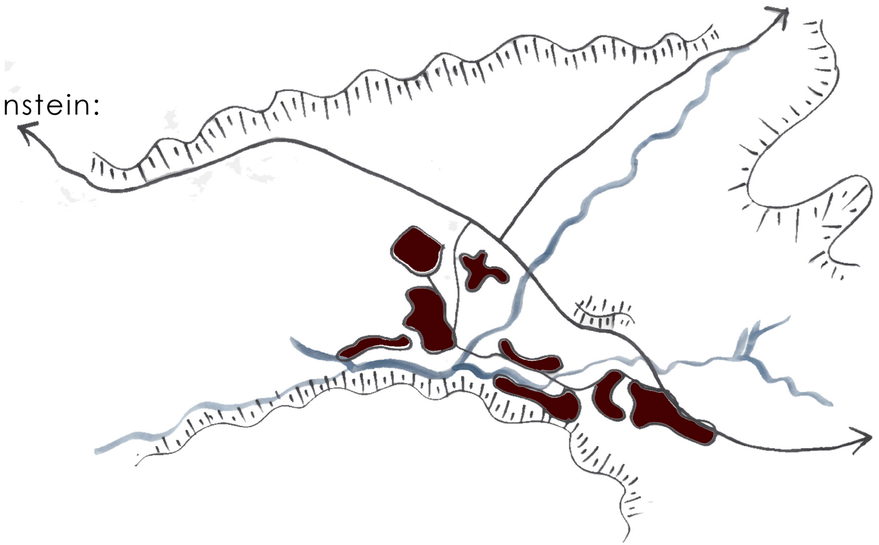


Figure 6.1: Settlement forms
Source: Author (2020)

Thinking Structurally & Spatially About Open Space:

6.2

Open Space as Part of Design Method

Hard and Soft Open Space as part of a Bigger Totality:

- Soft and hard systems of open space should not be distributed on an ad hoc basis across regions or settlements, nor should they comprise residual or 'left over' space.

- These two systems, along with other elements of public structure, (movement of all modes, public institutions and bulk utility services), should be integrated into a holistic system which makes up the public 'skeleton' of the region or settlement: the inter-connected public spatial network, which is the essence of settlement structure.

- The network creates geometry of point, line, grid and domain. This geometry creates a logic to which all activities whether they are large and small, formal and informal, respond in their own interests.

- The focus is on the relationship between open space and the other elements of public structure, in the ordering of regions or settlements (Dewar & Louw, 2017).

The Generic Geometries of Open Space:

- Point
- Line
- Grid
- Domain

[Zoar & Amalienstein]

Figure 6.2: Open Space
Source: Author (2020)

Regional Scale: Kannaland Municipality

Although the urban framework will be implemented at a local level, the conceptualisation of the scheme must be made from a regional level, where the rural settlements/towns can be seen as a matrix of subsystems contributing to a greater whole.

There are three main structuring elements of the Kannaland Municipal area:

• The most remarkable structuring element is the spectacular backdrop of the mountain spine comprising the Big Swartberg, Anysberg and Small Swartberg. These mountains provide principal bio-diversity, conservation and wilderness tourism opportunities.

• Within the Kannaland municipal area, the Little Karoo valley is further broken up by three isolated mountains, Bakenkop which forms a ridge with the Rooiberg to create a watershed between Ladismith, Zoar and Calitzdorp. Also creating a watershed is the R62 and Vanwyksdorp to the south. The other isolated mountain is the Touwsberg west of the R62.

• The Little Karoo valley, formed by the Swartberg and Langeberg range, approximately 10 to 15 kms south of the municipal boundary is traversed by the Groot- and Gamka Rivers. The famous Route 62 is the main route of the Little Karoo and its passes, extending for almost 360 kilometres between Uniondale and Montagu.

The three main structuring elements described above provide a foundation on which important town/settlements, businesses and activities are located.

These include:

• The Route 62 is heavily promoted as a tourism destination in its own right and provides a brand from which towns, especially rural settlements and tourism operations can benefit. Zoar, Ladismith and Calitzdorp all abut or straddle this route.

• Intensive agriculture, the focus of rural population concentrations, is mainly confined to the tributaries of the Groot River around Ladismith, Gamka and Olifants Rivers south of Calitzdorp and the Kobus River through Zoar.

• Vanwyksdorp is the smallest in the Kannaland Municipal region and is somewhat isolated from the rest of the settlements. It is located in the Groot River valley south of the Rooiberg. It takes access along the gravel R 327 which forms a very scenic loop road returning over the Rooiberg to Calitzdorp.

Regional Scale

Working at a regional scale, it identifies certain planning challenges which are to create a dynamic balance between the three landscapes of society.

The landscapes are as follows:
Wilderness, rural and urban.

Rural and wilderness landscapes should be seen as the positive elements. In the current South Africa the urban landscape is seen as positive and sprawl is destroying the other two. To achieve positive elements, the reservation of large 'rooms' of wilderness and rural space should be created.

They should be linked by green corridors to promote bio-diversity and creating a green lattice.

A green lattice will result in a hierarchy of settlements, playing different roles which occur in the spaces between the lattice in response to regional movement routes. Through creating the above mentioned, it will maximise synergies between the landscapes.

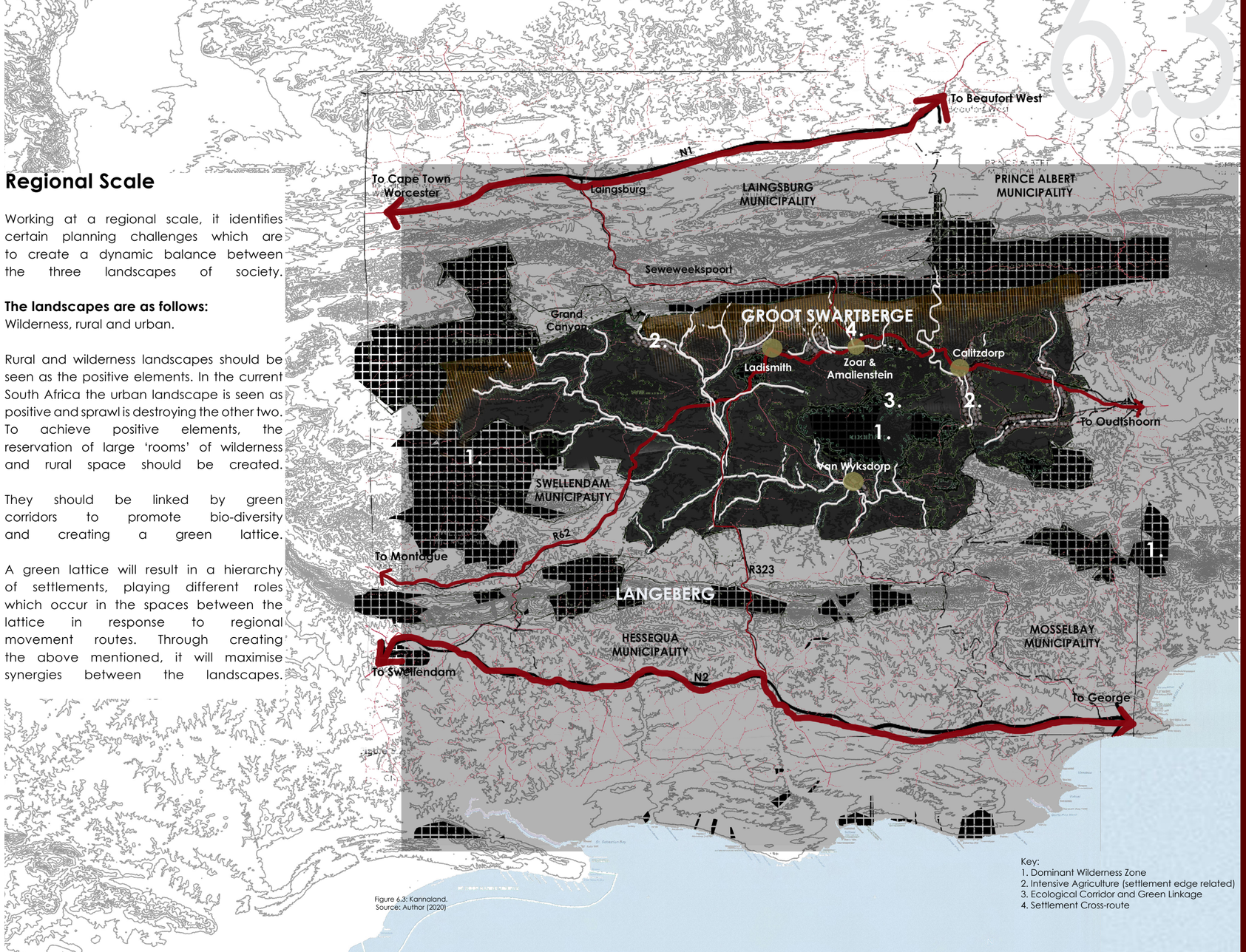


Figure 6.3: Kannaland.
Source: Author (2020)

Composite Constraints & Informants:

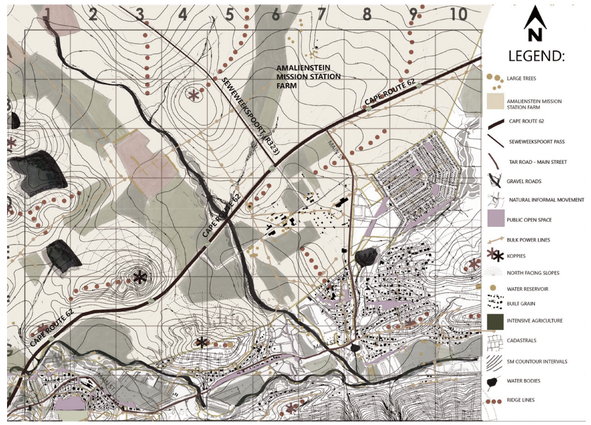


Figure 6.4: Composite Constraints and Informants
Source: Author (2020)

Dominant Spatial Problems:

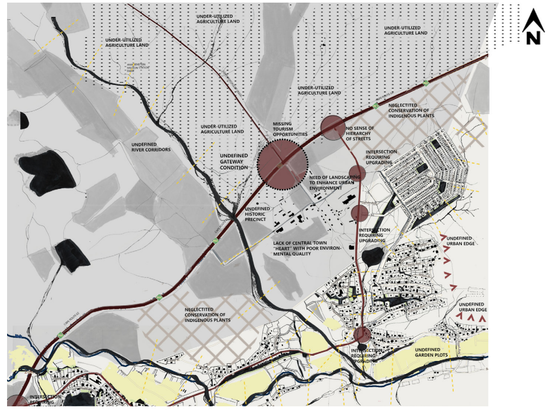


Figure 6.5: Dominant Spatial Problems
Source: Author (2020)

Rough Urban Framework:

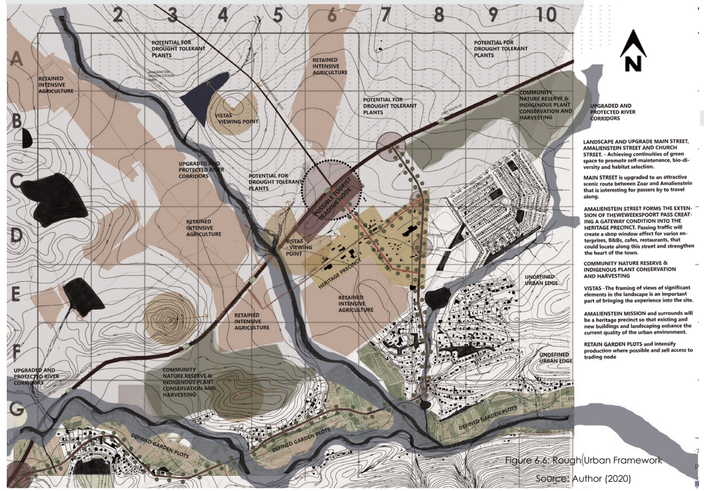


Figure 6.6: Rough Urban Framework
Source: Author (2020)

POSSIBLE STRATEGIES:

LANDSCAPE AND UPGRADE MAIN STREET, AMALIENSTEIN STREET AND CHURCH STREET. - Achieving continuities of green space to promote self-maintenance, bio-diversity and habitat selection.

MAIN STREET is upgraded to an attractive scenic route between Zoar and Amalienstein that is interesting to passersby.

AMALIENSTEIN STREET FORMS THE EXTENSION OF SEWEWEEKSPOORT PASS CREATING A GATEWAY CONDITION INTO THE HERITAGE PRECINCT. If they were to locate along this street various enterprises such as bed and breakfast estabalishments, cafes and restaurants would create a potential shop window effect for passing traffic , strengthening the heart of the town at the same time.

COMMUNITY NATURE RESERVE & INDIGENOUS PLANT CONSERVATION AND HARVESTING

VISTAS - The framing of views of significant elements in the landscape is an important part of bringing the experience into the site.

AMALIENSTEIN MISSION and surrounds will be a heritage precinct with new and existing buildings with landscaping enhancing the urban environment's current quality.

RETAIN GARDEN PLOTS and intensify production where possible while selling access to trading node.

UPGRADED AND PROTECTED RIVER CORRIDORS

Guidelines to Encoporate when Developing an Urban Framework:

Walking Distance as the Primary Measure of Access in Rural Settlements

The need to ensure that people have access to a variety of opportunities is implied in a number of principles. This requires an understanding of the relationships between different activities in terms of spatial proximity, access and time.

In the past accessibility has usually been considered in terms of travel time in private vehicles, however, this measurement is not only environmentally unsustainable, as it is mostly dependent on access to private motor vehicles but also reflects a denial of the reality that the majority of our citizens who live in rural settlements do not have private vehicles and may not always be able to afford public transport and thus have to spend significant time and energy walking to reach their desired destination.

Thus appropriate walking distances should always be used as the measure for accessibility. Twenty minutes or 1km is regarded as an acceptable distance to walk and should be used as a basis of settlement design.

Land use integration and interface:
The implementation of the walking distance principle to promote greater access to opportunities for all will require the functional integration of activities.

Principles:
• Locate activities (residential, transport, work, recreation, etc.) so that at least 50 percent of them are in walking distance;

• Locate most frequented activities in the most central / accessible localities, e.g. industrial and commercial;

• Locate all future residential areas within walking distance of settlement centres where space permits.

As per Kannaland Municpal report the following Infrastructure is needed:

• Water
- Repair/provide new bulk water meters at the abstraction point.
- Raising of the Tierkloof Dam wall and adding another dam at a lower point closer to Zoar and Amalienstein
- Upgrade/enlarge the bulk water pipeline from the Tierkloof Dam.

• Sewer
- Basic repairs and maintenance
- Provision of new aerators, extension of ponds and irrigation system
- Provision of biological filter

• Electricity
–Provision of high mast lighting.

• Transport

Non-motorised Transport:
- NMT (National Department of Transport) facilities along key pedestrian and business routes.
- Improve unsafe pedestrian and cycle conditions to farming areas
- Repair existing sidewalks

Public Transport:
- Provision of shelters and embayments

Roads:
-All gravel internal roads in Zoar to be upgraded with paving.
- Provision of street lighting
- Maintenance of existing tarred streets

Stormwater:
-provision of a stormwater network
-Care should be taken that designs and materials used in stormwater upgrading are in keeping with the rural village footprint.
As opposed to water in concrete drains and pipes, water should be detained at grade through an integrated landscape and engineering approach, thereby promoting natural processes.

The following additional projects should be considered:
• Implement a multi-pronged water management strategy:(regenerate)
o Rainwater harvesting o Grey water recycling o Reducing unaccounted for water
• Promote domestic and large scale solar energy usage and projects such as wind and solar farms subject to appropriate guidelines and siting principles.

Precinct Scale: Main Ideas Informing the Framework:

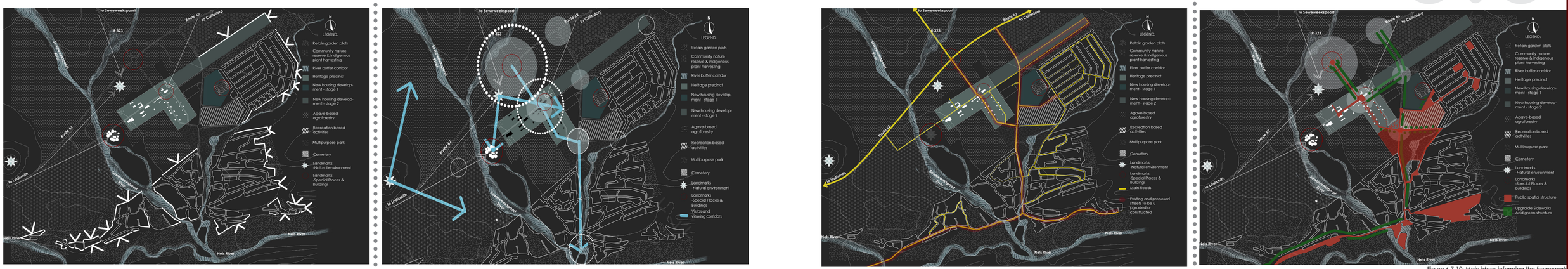


Figure 6.7-10: Main ideas informing the framework

Source: Author (2020)

Built Edge Consolidation.

The map shows the value of compaction and the need for clear, hard edges. This promotes compaction rather than expansion of settlements to encourage non-motorised transport modes where appropriate. Sprawl is a destructive and non-sustainable urban form, in terms of the destruction of wilderness and productive agricultural land.

It also results in high transportation costs, high levels of greenhouse gas emissions and weak local markets which discourage small-scale economic activity. The edges should not be administratively determined but should rather be made through built form. It is proposed that these urban edges only be realigned based on actual need and once all the existing under or unutilized vacant land has been developed.

Landmarks.

Landmarks are a type of pointer of urban space. They are defined as an external point of reference that help orientate in a familiar or an unfamiliar environment. When these are not provided by the natural environment, they must be created through the structural use of higher buildings at strategic places.

Heritage.

Heritage is a very important part of any settlement. To design with heritage is to have respect for, and the enhancement of, historic elements and precincts of value. If there are buildings of historic value it is important to design a 'historic precinct' where new development should not compete with it but rather frame them and give them breathing space.

Hierarchy of Public Institutions.

Appropriately, the hierarchy of public institutions responds to hierarchies of access. The highest order of activities would take place at the most accessible spaces and places.

Shafts of Space, Axial Alignments and Focal Points.

The visual experience of settlements can and should be enhanced through the use of design devices such as the creation of shafts of space to emphasise views, axial alignments between important elements. A common device used historically in the making of small towns in South Africa, for example, was the axial alignment of peaks outside of the settlement and institutional buildings of importance such as the church and the use of buildings as focal points along important routes (Dewar, 2017).

Vistas and viewing corridors.

The framing of views of significant elements in the landscape is an important part of bringing the experience of the landscape into the settlement. Views need to be considered from two perspectives – from the inside out and from the outside in. When appropriate, movement routes should be orientated in such a way that they become viewing corridors.(Dewar, 2017).

Hierarchy of Movement Routes.

It is vital to view a movement network as a network of public rights-of-way, as opposed to simply as a network of roads. The characteristic of positively performing environments is that they have a clear, legible movement hierarchy and they consider different movement modes: footways, roadways, pathways, cycle ways, and sometimes railways.

A key factor in the flexibility of settlements is: public activities always seek out places of higher accessibility; even if the precise activity changes. More public activities always follow the same pattern. The bigger the range of choices of movement are, the greater the ability of the settlement to accommodate all activities.

The movement framework in this settlement should be based on a rhythm of convenient walking distance that creates an 'accessibility surface' which clearly indicates where more intensive activities should locate. A fine-grained permeable street grid would offer pedestrian convenience and a choice of walkable routes.

Gateways.

At the moment there is no 'gateway condition' into the settlement. The entrances into the settlement should be spatially announced, as should special precincts within them. This can be achieved by 'pinching' the space through the use of buildings or by creating splays.

Green Structure.

This settlement lacks green spaces in general. The diagram shows an attitude to green space within the precinct. The main concern here is achieving continuities of green space to promote self-maintenance, bio-diversity and habitat selection. This will be done through tree planting to create continuity of green space.

One of the trees that will be planted is the Platanus acerifolia(evergreen & indigenous).

There is a need to upgrade the entry point with green structure, so it can act as a gateway to the area and contribute to the tourism potential.

The design of multipurpose parks with multiple uses will be incorporated. The possible uses are:
- intensive small scale agriculture;
-woodlots;
- a nursery;
- a recreational park with children's play equipment, braai and picnic facilities.
-An ecological park associated with a river; -sport facilities.

Opportunities for agriculture are another important part of the green network of a settlement. This will be done through allotments, community gardens and school based gardens.

Potential Rural Nodes and Periodic Rural Markets

6.7

The potential of rural nodes is taken from the rural economic opportunities generated by their location and "attracting force".

Nodes should be managed to concentrate the business therein and where growth is required. The nodes should be encouraged to grow along the corridor towards each other.

However, in some nodes these forces are so small that permanent infrastructure or services cannot justify permanent buildings or staff.

Initially, these nodes may be supported through periodic markets at which mobile services may be dispensed.

The services of private sector organisations and various government departments should be co-ordinated into mobile caravans which travel from periodic service centres halting for regular morning or afternoon sessions of duty.

Figure 6.11: Rural Nodes
Source: Kannaland(2013)

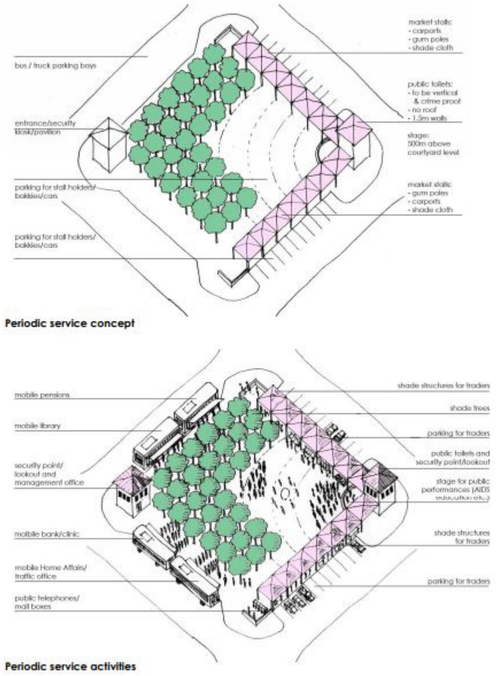


Figure 6.13: Rural Nodes
Source: Kannaland(2013)

Generic network configurations:

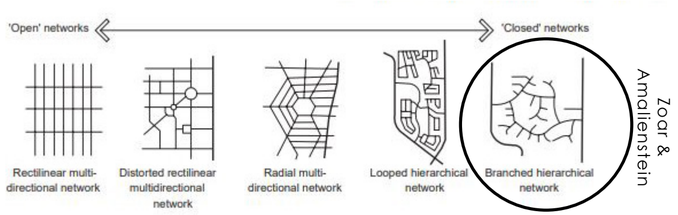
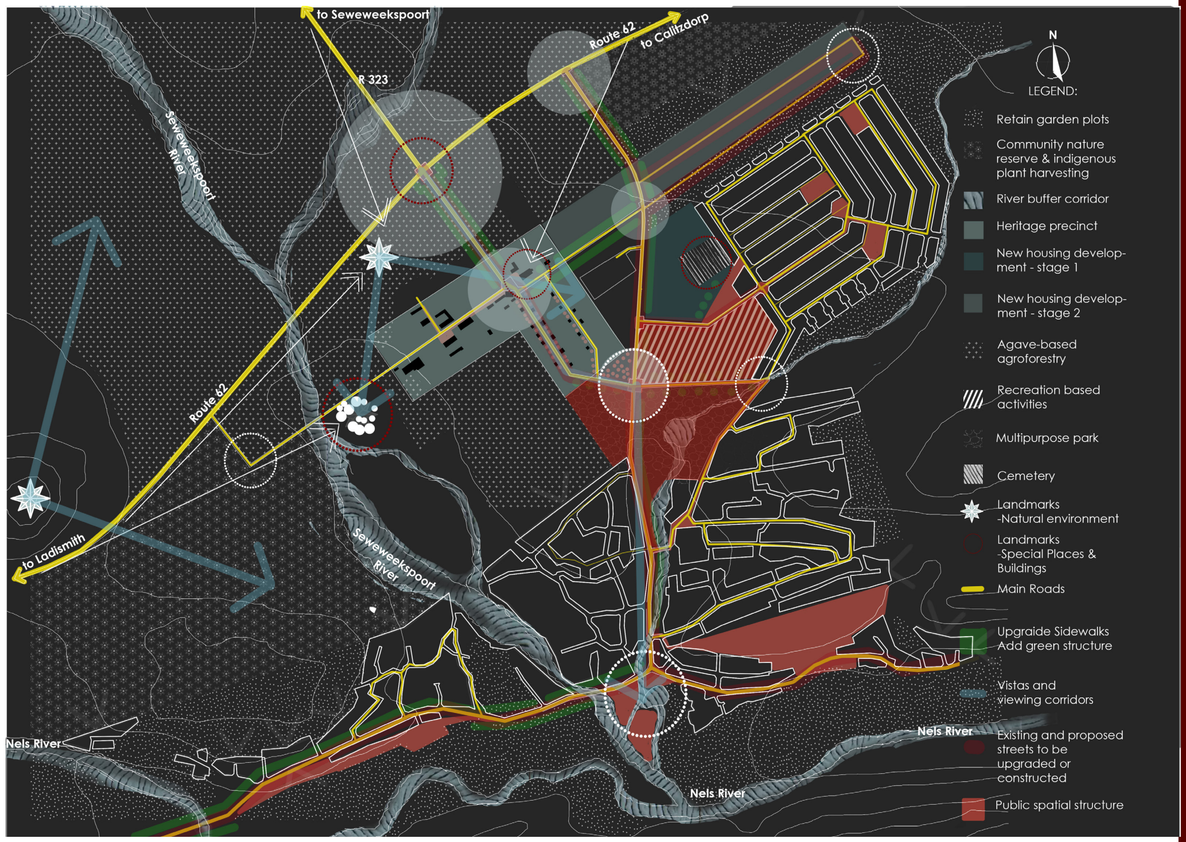


Figure 6.12: Generic network configurations
Source: Unknown (2015)

Precinct Scale: Urban Design Framework

6.8



The Proposed Urban Development Framework is formed through a set of strategies by analysing the precinct area through three different scales in the previous chapter. Different structuring elements, guidelines of urban planning and community reports were used to form this framework.

This framework shows how the proposed 'padstal' fits into the urban plan and how the whole community may enjoy its benefits. The urban framework also took a very respectful stance towards green spaces, the balance between them and the build footprint.

One of the main goals was to create a 'heart' for this settlement through the intervention of a tourist attraction which is the 'padstal'. Another goal is to create a gateway into the settlement, because before this there was confusion on how to enter the settlement.

Figure 6.14: Final Urban Development
Source: Author (2020)

DESIGN DEVELOPMENT

[Ch. 07]

[part] B 7.0

Introduction

General Information & Chapter Outline:

The 'Padstal' design approach proposes an expression of a historic farmstead layout with a main structure and several sub substructures, open and enclosed spaces as well as several other elements such as walls and water bodies and furrows. A series of spatial experiments led to an appropriate response from a spatial organisation point of view.

The concept of the design is based on a double-skin light weight pitch roof structure that is supported by upright timber columns build on a grid system. Some of the sides of this structure will be enclosed by stone or clay brick walls, while some sides will be left open to form verandas ('stoepe').

The material usage responds critically to the vernacular history and climate of the region. The technical resolution is based on the idea that the community would be able to built the structure with local building materials.

Defining the Programme

7.1

The design aim for this treatise is to design a 'Padstal', a regenerative driver for the degraded rural landscape, in the Little Karoo for the communities of Zoar and Amalienstein.

The programme aims to establish household security for the communities through the design of a 'Padstal" together with agave based Agro-forestry. This design also aims to create a sense of place and belonging to this rural communities and a rest stop to tourists.

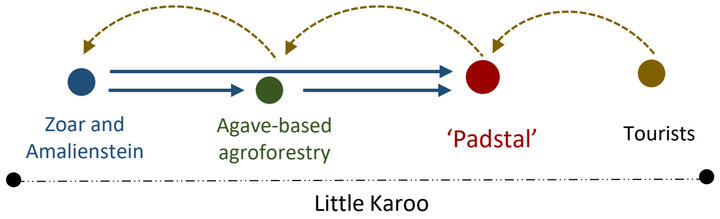
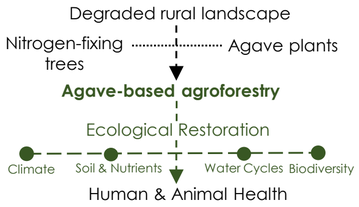


Figure 7.1 : Defining the Programme
Source: Author (2020)



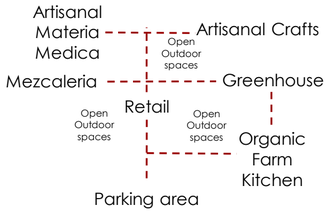


Figure 7.2 : Programme Components
Source: Author (2020)

Programme components:

1. The 'Padstal':
The 'Padstal' component of the project will consist of the programmatic components of a retail area, an organic farm kitchen, a mezcaleria, an artisanal materia medica, a greenhouse, artisanal crafts area, parking and outdoor spaces integrated into the site. This component will be a means of inserting farm production into the tourism market through the built environment.

2. Agave-based agro-forestry:
This component will be integrated into the current Amalienstein community farm to establish sustainable agriculture through ecological restoration processes, which will serve as a driver to combat global warming and poverty.

User Groups

7.2

The first user group of this design intervention will be residents of the Zoar and Amalienstein communities. The second user group will be tourists visiting the design intervention and the third will be the surrounding communities that will also include entrepreneurs, artisans and produce producers.

1] Residents of the Zoar and Amalienstein communities:
As this design intervention will be built on the Amalienstein Community Farm, all the residents of these two communities will be granted to work there, either as employees in the 'padstal' or in the agave-based agroforestry. These employees could be artisans, farmworkers, craftworkers, restaurant workers, garden workers or any position that needs to be filled to ensure the success of the programme. Current subsistence farmers or artisans will be allowed to sell their produce in the 'padstal'.

2] Tourists:
The 'padstal' component of the design intervention is the economic generator of the programme and is aimed at domestic and international tourism as a rest stop.

3] Surrounding communities:
Subsistence farmers, artisans and entrepreneurs of the surrounding communities would be allowed to sell produce, products and other needed services at the 'padstal'.

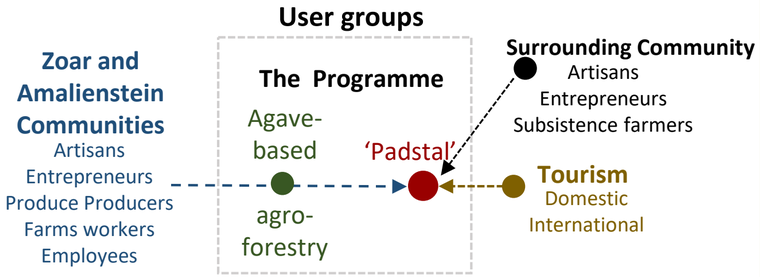


Figure 7.3 : User Groups
Source: Author (2020)

Spaces & Activities

4. ARTISINAL MATERIA MEDICA

- Shop / Showroom
- Offices
- Production / Factory
- Sustainable Services
- Herb Garden
- Animal Fodder

5. ARTISINAL SISAL CRAFTS

- Work Rooms
- Sisal
- Staff Ablutions
- Staff Room (Showers / kitchenette)
- Outside Drying Werf
- Delivery
- Service Space

6. GREENHOUSE

-Greens for the Organic Farm Kitchen
-Guest Experience
-Seating

7. WATER FEATURE

- Original Dam
- Water Furrows

3. MEZCALERIA

3.1. Bar / Tastings

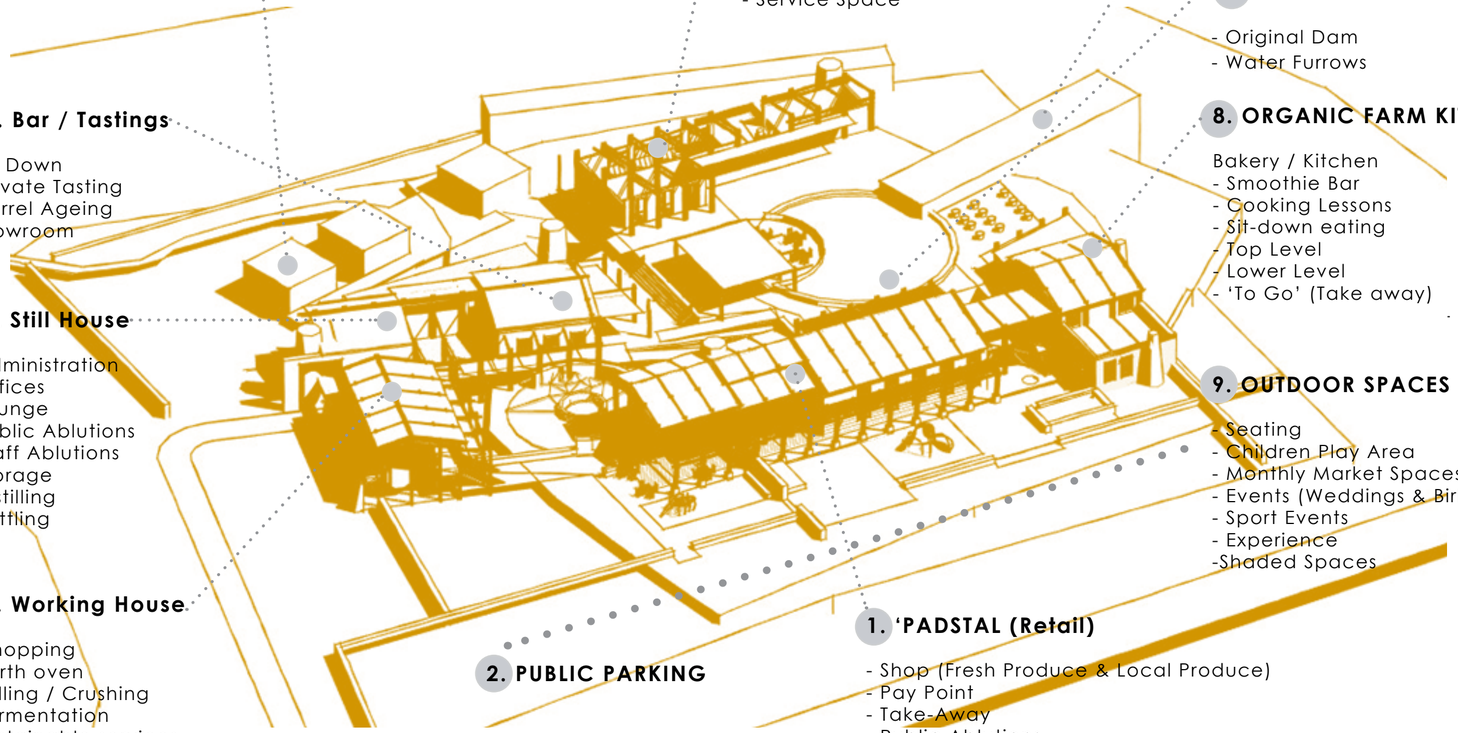
- Sit Down
- Private Tasting
- Barrel Ageing
-Showroom

3.2. Still House

- Administration
- Offices
- Lounge
- Public Ablutions
- Staff Ablutions
- Storage
- Distilling
- Bottling

3.3. Working House

- Chopping
- Earth oven
- Milling / Crushing
- Fermentation
- Sustainable services
- Battery Room
- Solar Panel Room
- Waterwheel & Channel
- Delivery Space



8. ORGANIC FARM KITCHEN

Bakery / Kitchen
- Smoothie Bar
- Cooking Lessons
- Sit-down eating
- Top Level
- Lower Level
- 'To Go' (Take away)

9. OUTDOOR SPACES

- Seating
- Children Play Area
- Monthly Market Spaces
- Events (Weddings & Birthdays)
- Sport Events
- Experience
-Shaded Spaces

2. PUBLIC PARKING

1. 'PADSTAL (Retail)

- Shop (Fresh Produce & Local Produce)
- Pay Point
- Take-Away
- Public Ablutions
- Staff Ablutions
- Staff Room (Lockers & Kitchenette)
- Relaxing Area

Figure 7.4 : 3D Conceptual Image
Source: Author (2020)

Accommodation Schedule

7.4

Figure 7.5 : Collage
Source: Author [2020]

[Total area]

MEZCALERIA

Greens for Kitchen

'PADSTAL'

-Entrance Circulation	264m²
- Shop	250m²
(Fresh Produce & Local Produce)	
- Pay Point	
- Take-Away	72m²
- Public Ablutions	72m²
- Staff Ablutions	49m²
- Staff Room	20m²
(Lockers & Kitchenette)	
- Relaxing Area	
Total:	900m²

Bar / Tastings

- Sit Down	100m²
- Private Tasting	100m²
- Barrel Ageing	
-Showroom	
Total:	200m²

Still House

- Administration	
- Offices	9m²
- Lounge	36m²
- Public Ablutions	10m²
- Staff Ablutions	20m²
- Storage	6m²
- Distilling	51m²
- Bottling	12m²
Total:	150m²

Working House

-Working Yard	150m²
Chopping	
Earth oven	
- Milling / Crushing	9m²
- Fermentation	54m²
- Sustainable services	
- Waterwheel & Channel	
- Battery Room	
- Solar Panel Room	
- Delivery Space	
Total:	220m²

ARTISINAL MATERIA MEDICA

-Entrance Circulation	264m²
- Shop	250m²
(Fresh Produce & Local Produce)	
- Pay Point	
- Take-Away	72m²
- Public Ablutions	72m²
- Staff Ablutions	49m²
- Staff Room	20m²
(Lockers & Kitchenette)	
- Relaxing Area	
Total:	727m²

ARTISINAL SISAL CRAFTS

- Work Rooms	
- Sisal	
- Staff Ablutions	
- Staff Room (Showers / kitchenette)	
- Outside Drying Werf	
- Delivery	
- Service Space	
Total:	201m²

GREENHOUSE & WATER FEATURE

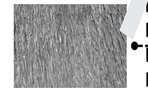
-Greens for the Organic Farm Kitchen	
-Guest Experience	
-Seating	
- Original Dam	
- Water Furrows	
Total:	574m²

ORGANIC FARM KITCHEN

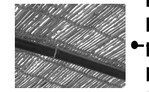
Bakery / Kitchen	80m²
- Smoothie Bar	
- Cooking Lessons	
- Sit-down eating	160m²
- Top Level	
- Lower Level	
- 'To Go' (Take away)	
Total:	240m²

Vernacular Structures, Elements and Materials of Zoar and Amalienstein (and region)

Different cultures inhabited the Amalienstein Mission Station and adjacent area over the years. These inhabitants built vernacular structures, each with their own individual type of architecture, that responded to the unique climatic conditions as well as to the economical constraints.


Thatch


Stone


Reed


Clay bricks


Timber Poles


Timber Planks


Lime Mortar


Corrugated iron


Rondavels


'Stoep'


Stone Buildings


'Brakdakke'


Corbelled


'Leivore'


'Matjies huis'


Cape Dutch


Cape Gothic


'Werf' walls


Victorian

Figure 7.6 : Vernacular
Source: Author (2020)

Spatial Planning Development

[Spatial Experiments]

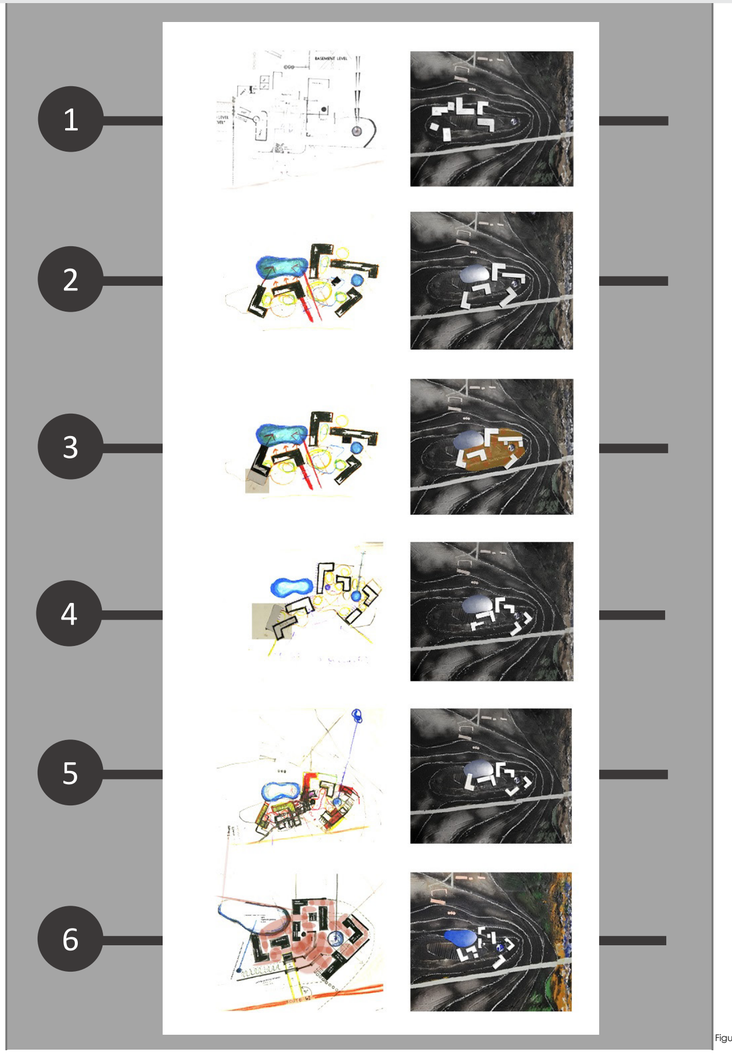


Figure 7.7 : Spatial Experiments
Source: Author [2020]

The Design Process [Crits]

[Physical & Spatial]

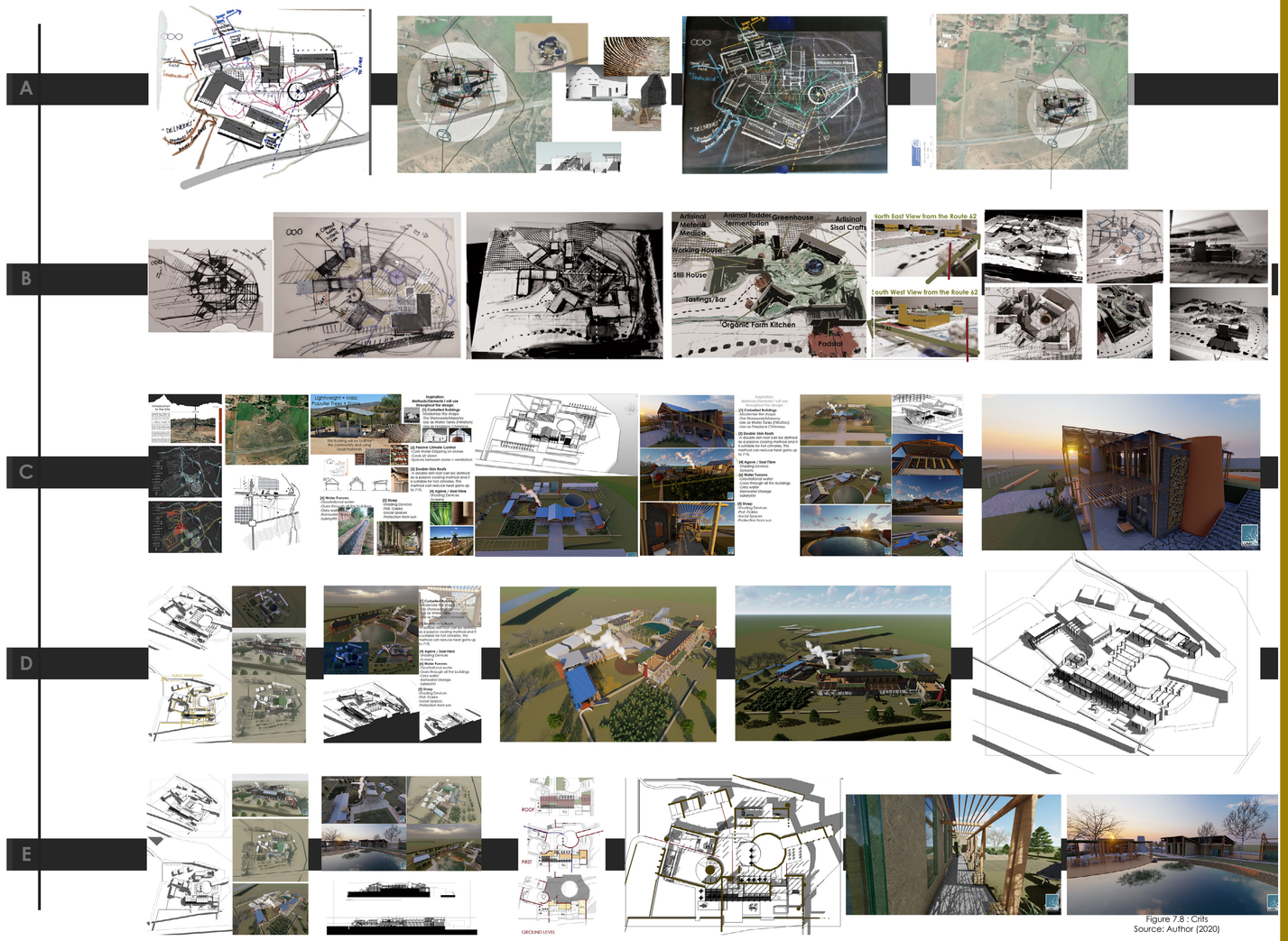


Figure 7.8 : Crits
Source: Author (2020)

Conceptual Drivers

Vernacular

A double-skin roof, that relate to the existing context, is a passive cooling solution to curb heat gain into buildings

The site has a strong vernacular history

Rocks, that relate to the existing context, are tightly squeezed together by 'wood shelves' to insulate the facades.

Physical

The original inhabitants of the Karoo named the place 'land of thirst'.

Water is Life

- On, Around, and Through Water -

The use of water not only for aesthetic purpose but to promote sustainability and the creating of life.

Mass and Lightweight

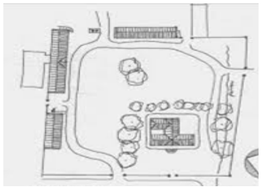
Relating to vernacular building structures of the area, mass walls, from stone and /or clay bricks and lightweight roof construction, from local timber, will be investigated.

Stone and Timber

Historic

'Werf' walls, relating to the existing farmstead context, extending into the building, merging outside with inside.

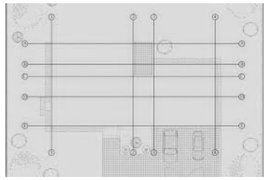
'Werf' walls
Farmstead layout



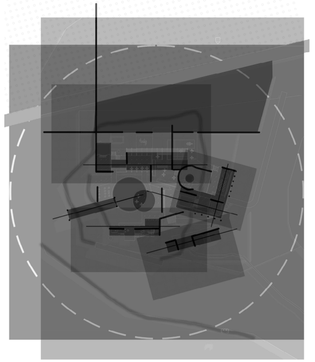
Main structure forms the center point of farmsteads with working buildings and private areas at back and arrange around of main structure.

Grid

The use of a grid system, that relate to the existing farmstead layout, to ensure effective space planning, structural efficiency and solid design layouts.



Irregular Grid



Materials

The agave cactus is an incredibly versatile plant. Except from local materials, materials made from the agave plant will form the foundation of the design concept by utilising their properties in terms of their type, size and limitations.

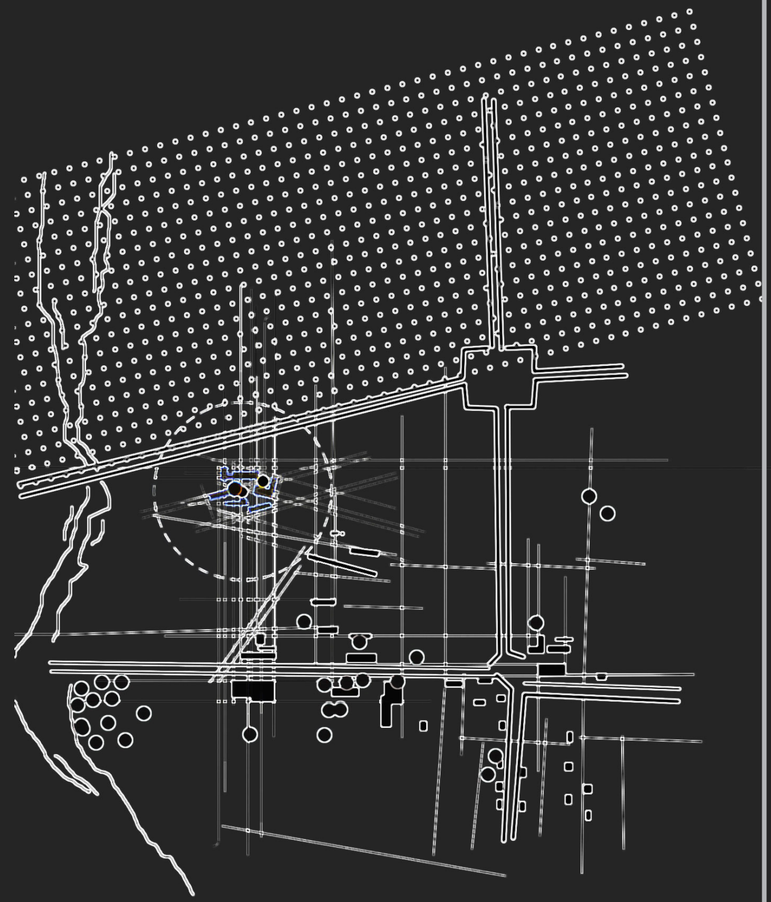
Agave byproducts
Sisal fiber

Figure 7.9 : Conceptual Drivers
Source: Author (2020)

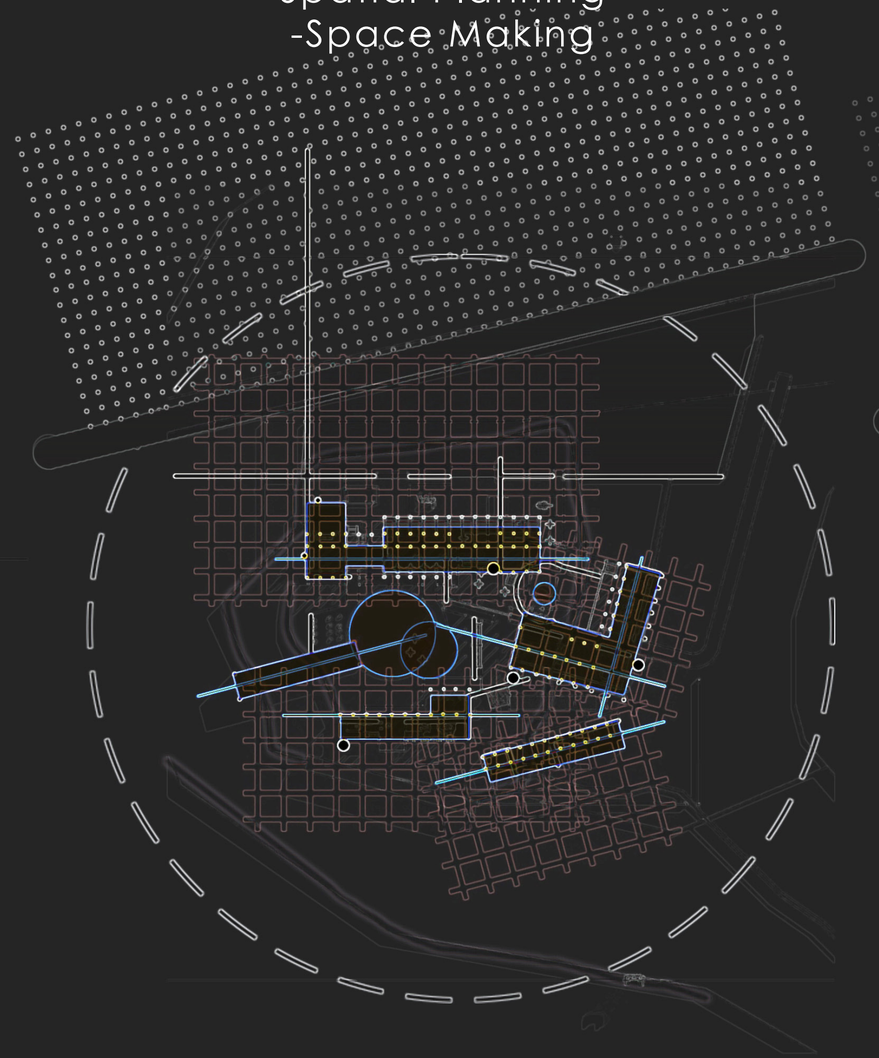
Main Strategies

7.8

Contextual Grid



Spatial Planning -Space Making



Timber Elements on a Grid with Stone Mass infill to create a sense of enclosure

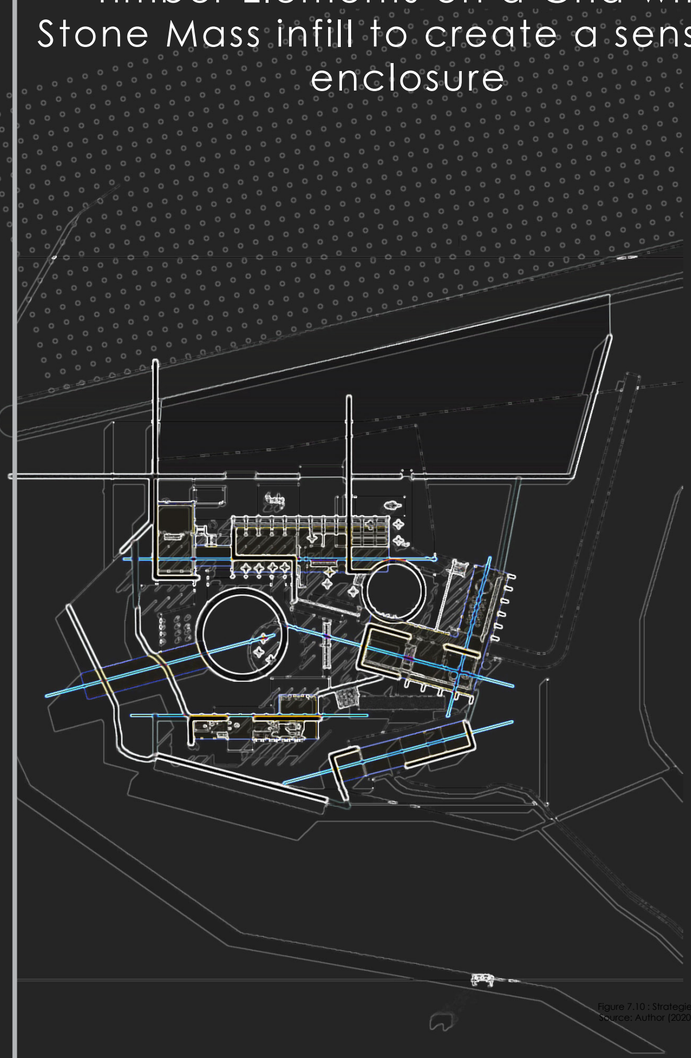


Figure 7.10 : Strategies
Source: Author (2020)

7.9

MODELS

Figure 7.11: Models
Source: Author (2020)

DRAWINGS

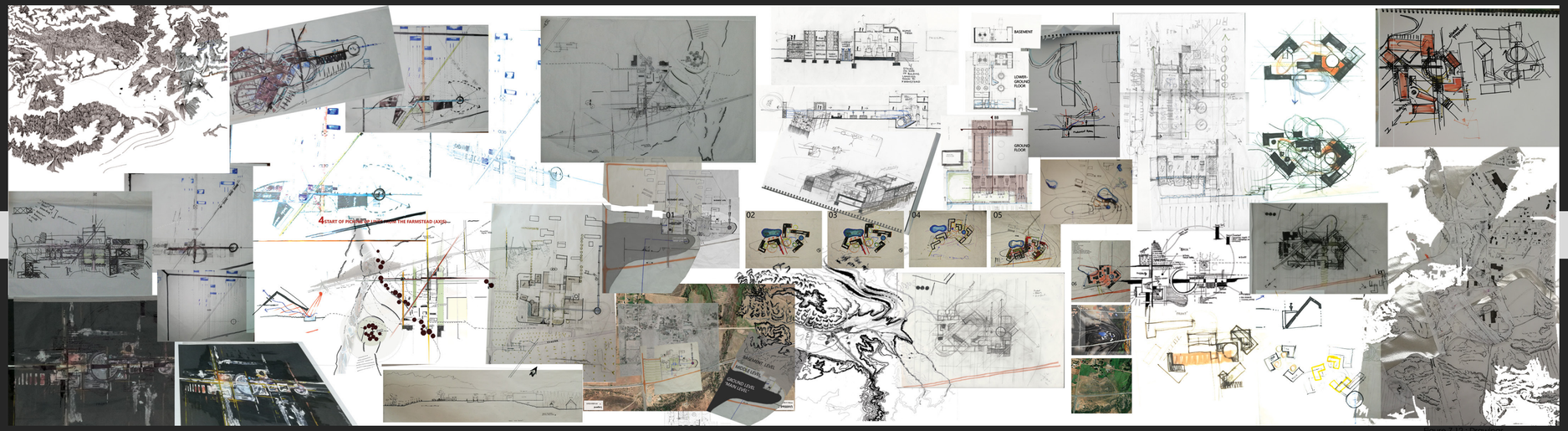
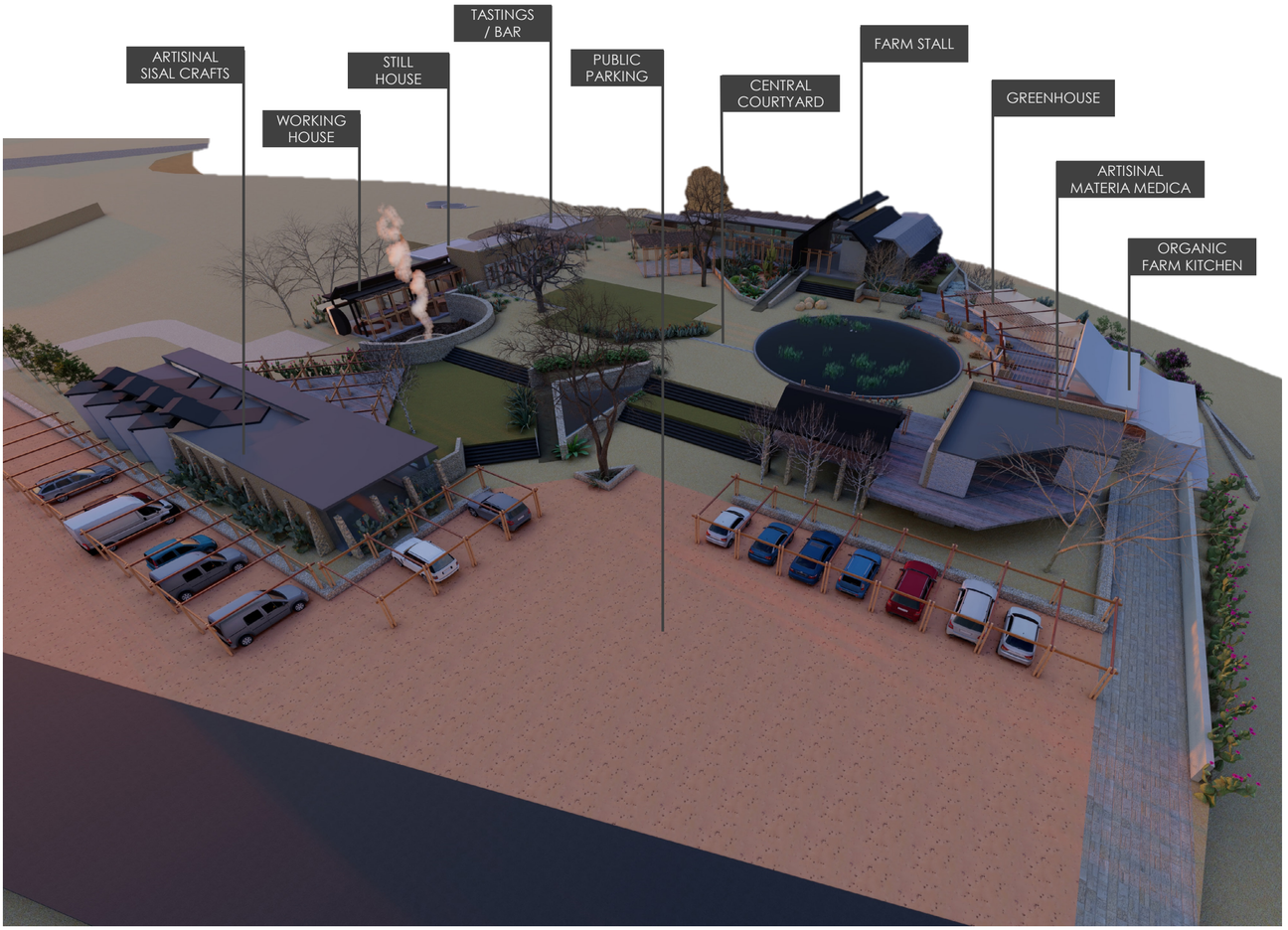
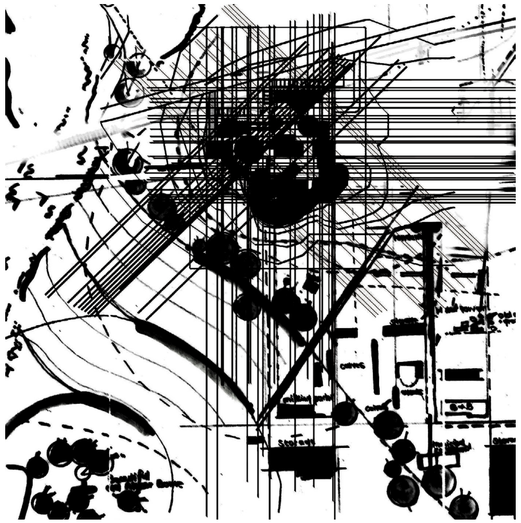
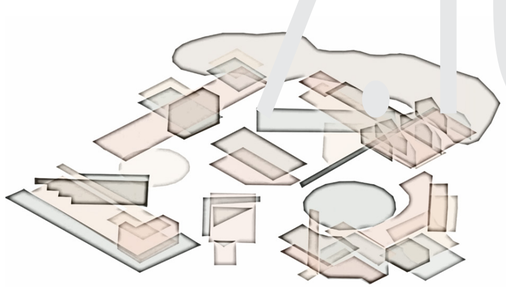


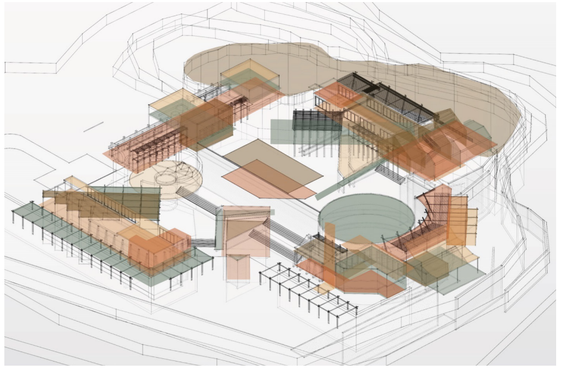
Figure 7.12: Drawings
Source: Author (2020)

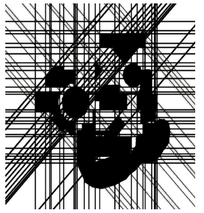
June Portfolio

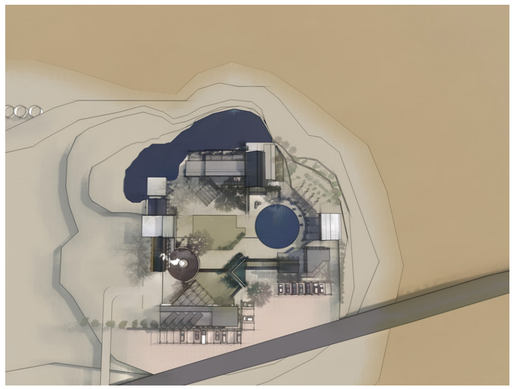












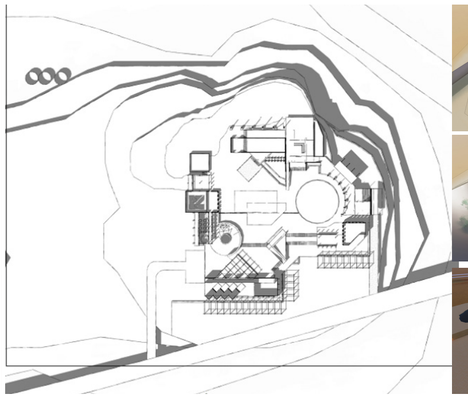
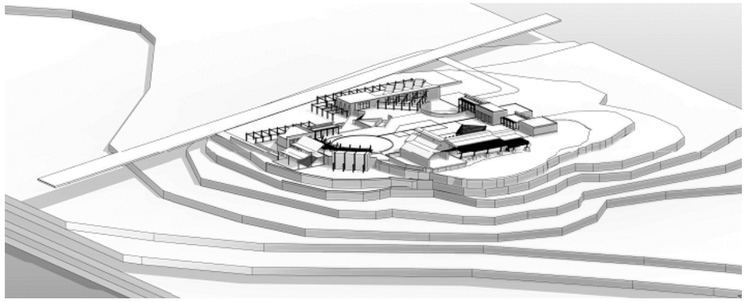
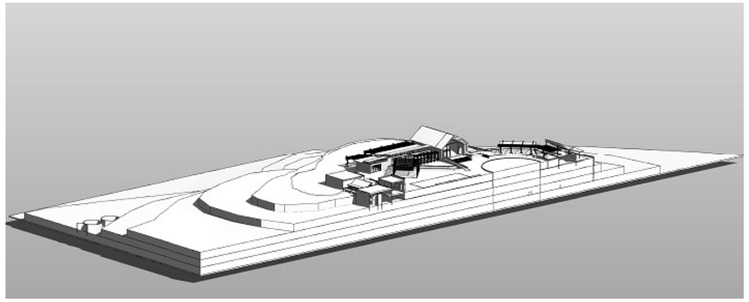
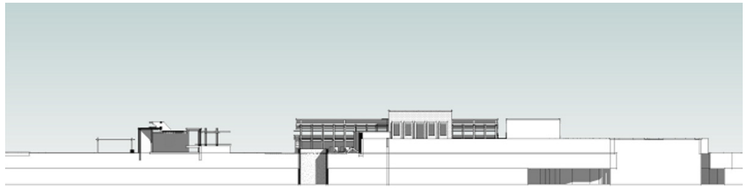
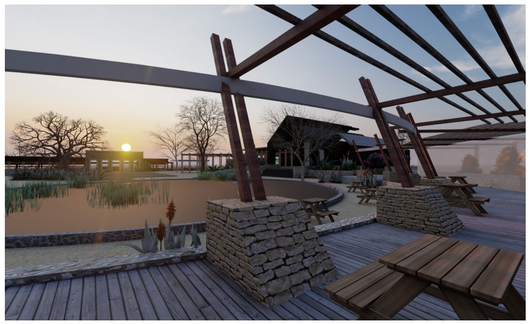


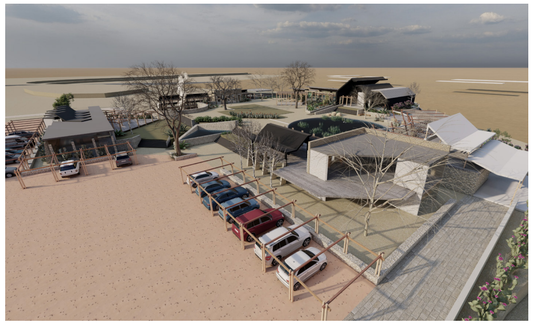
Figure 7.13 : June 1
Source: Author (2020)

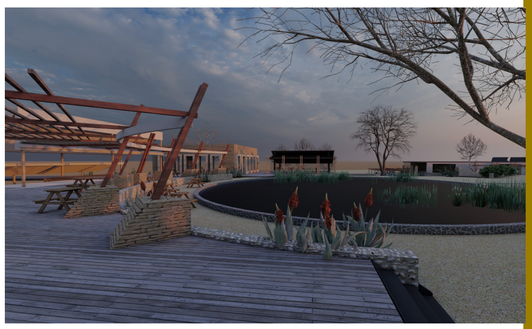












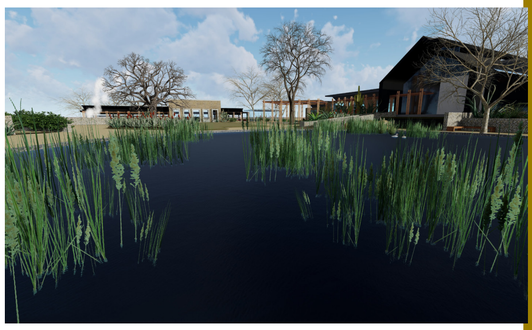


Figure 7.14 : June 2
Source: Author (2020)

FINAL DESIGN

Ch. 08

[part]

B

8.0

Introduction

General Information & Chapter Outline:

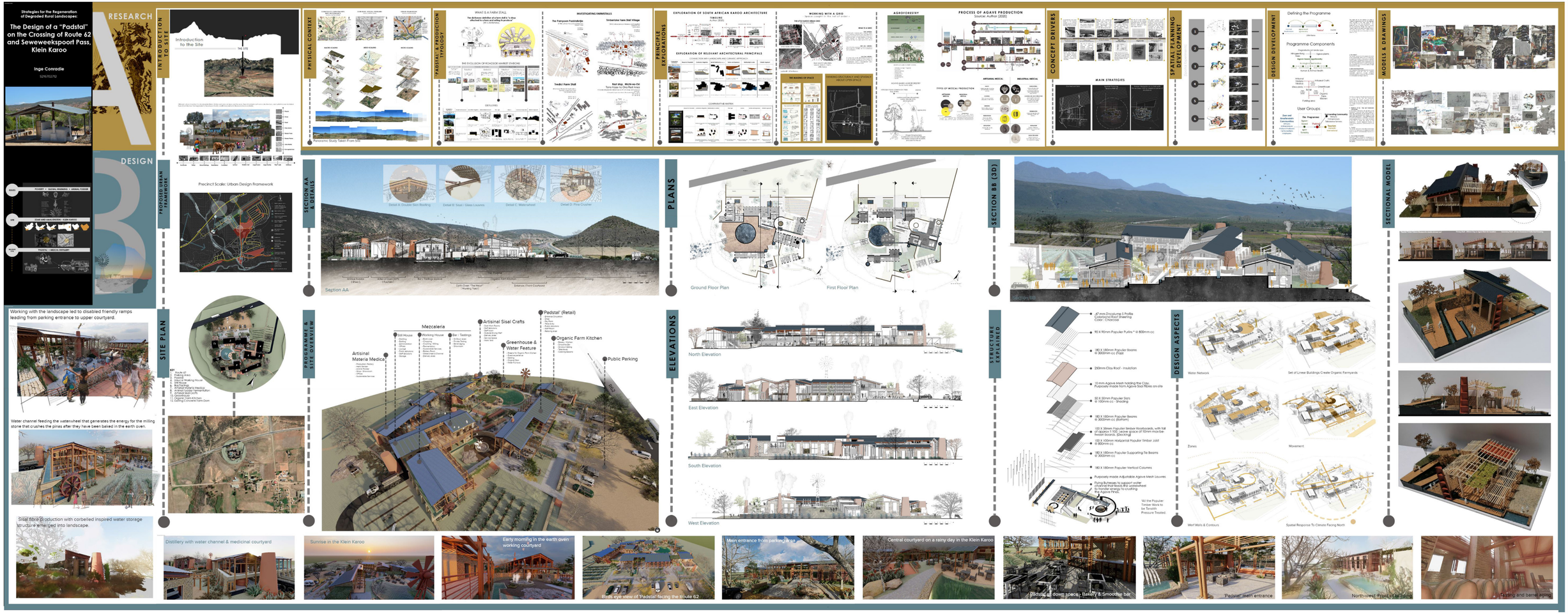
This chapter represents the final design presentation as well as photographic images of the models as presented at the final examination.

All images in this chapter are by the Author(2020)

The Final Mural

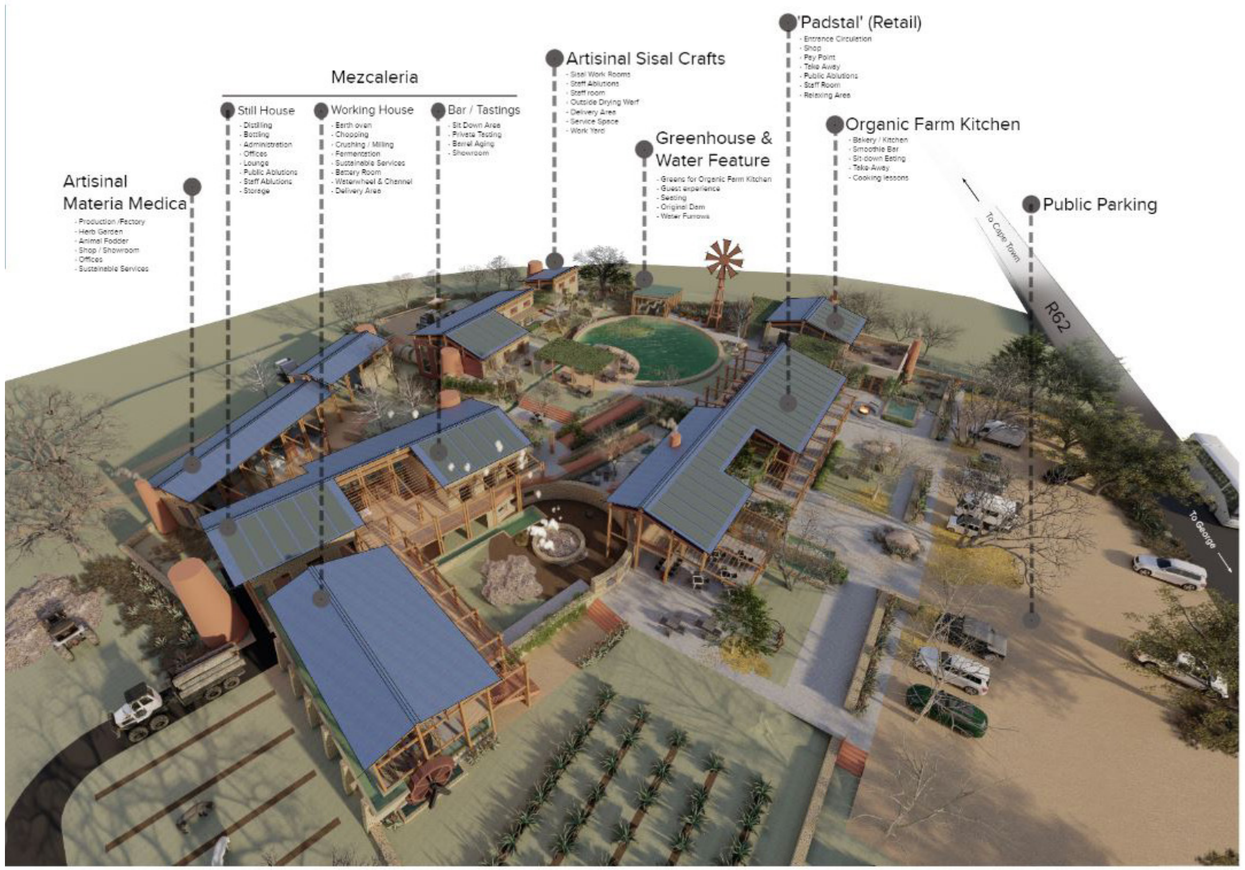
[Part A & B]

8.1

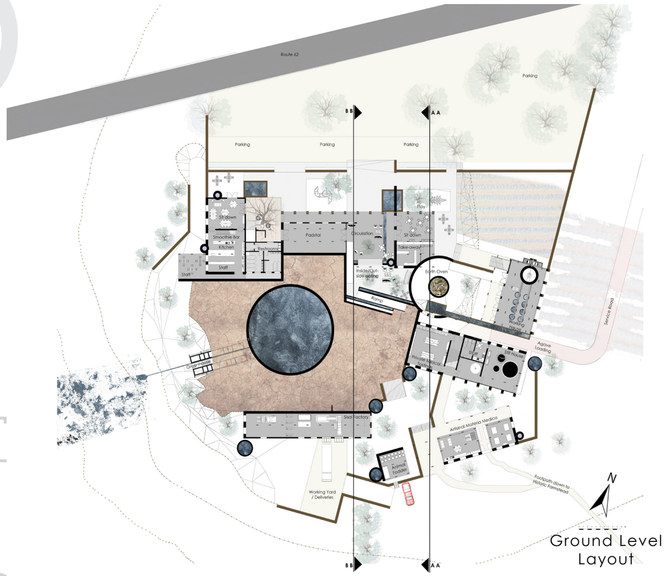


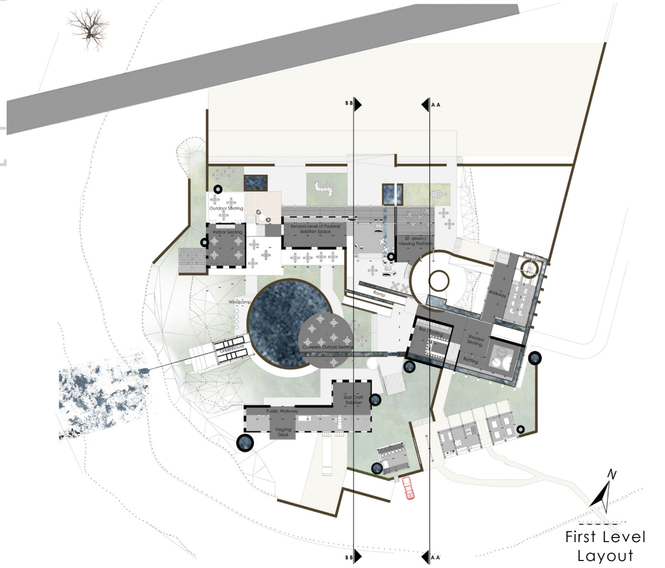
Program & Site overview

8.2&3



[plans / layouts]

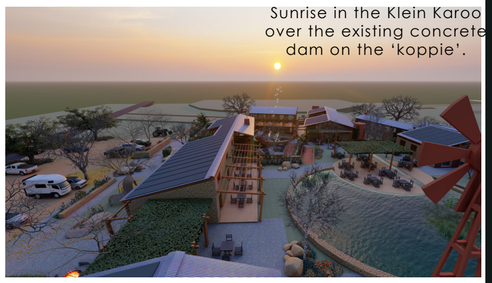





'Padstal' main entrance.


Distillery with water channel & medicinal courtyard.


Early morning in the earth oven working courtyard.


Sunrise in the Klein Karoo over the existing concrete dam on the 'koppie'.

Elevations

8.4

Water channel feeding the waterwheel that generates the energy for the milling stone that crushes the pinas after they have been baked in the earth oven.

North Elevation

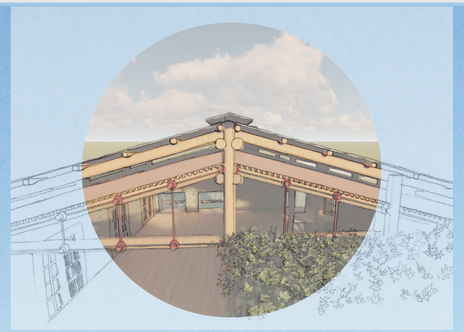
East Elevation

South Elevation

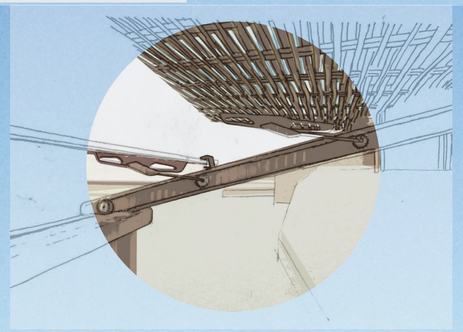
West Elevation

Section A - A & Construction Details

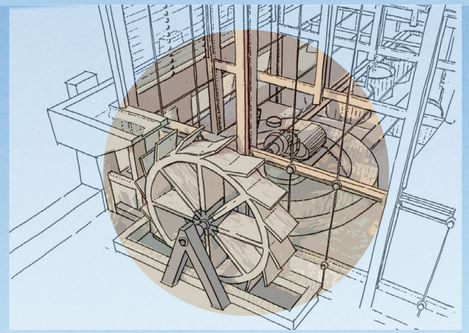
8.5&6



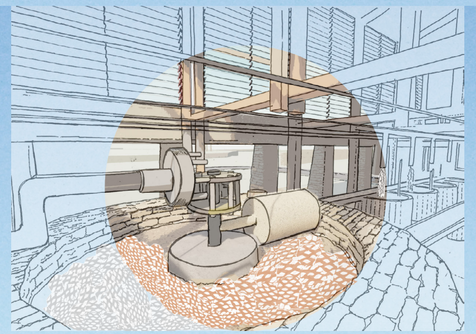
Detail A: Double Skin Roofing



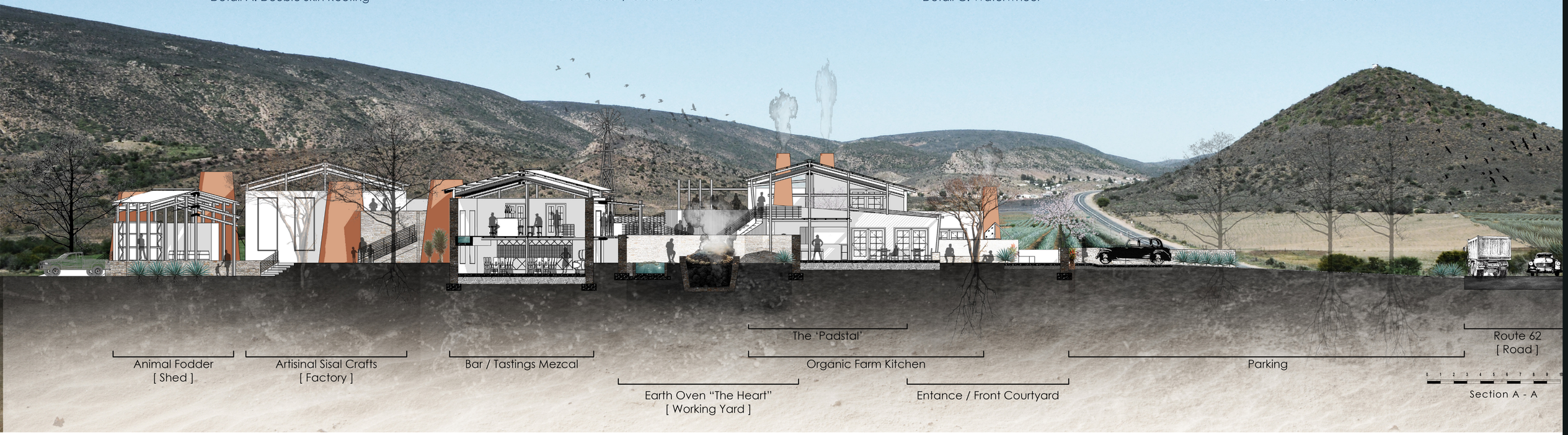
Detail B: Sisal / Glass Louvres



Detail C: Waterwheel



Detail D: Pina Crusher



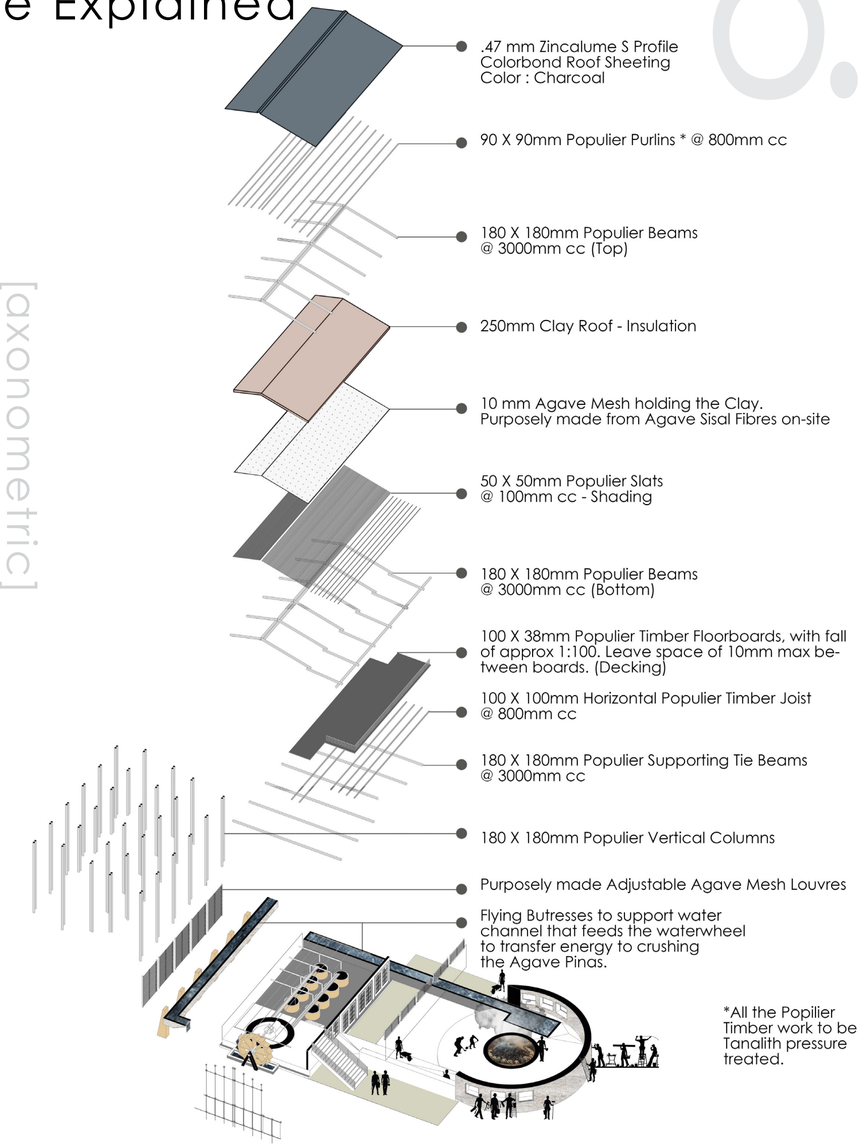
‘GATEWAY THROUGH ‘PADSTAL’ TO UPPER CENTRAL COURTYARD

Working with the landscape let to disabled friendly ramps leading from the parking entrance to the upper courtyard

Structure Explained

8.7

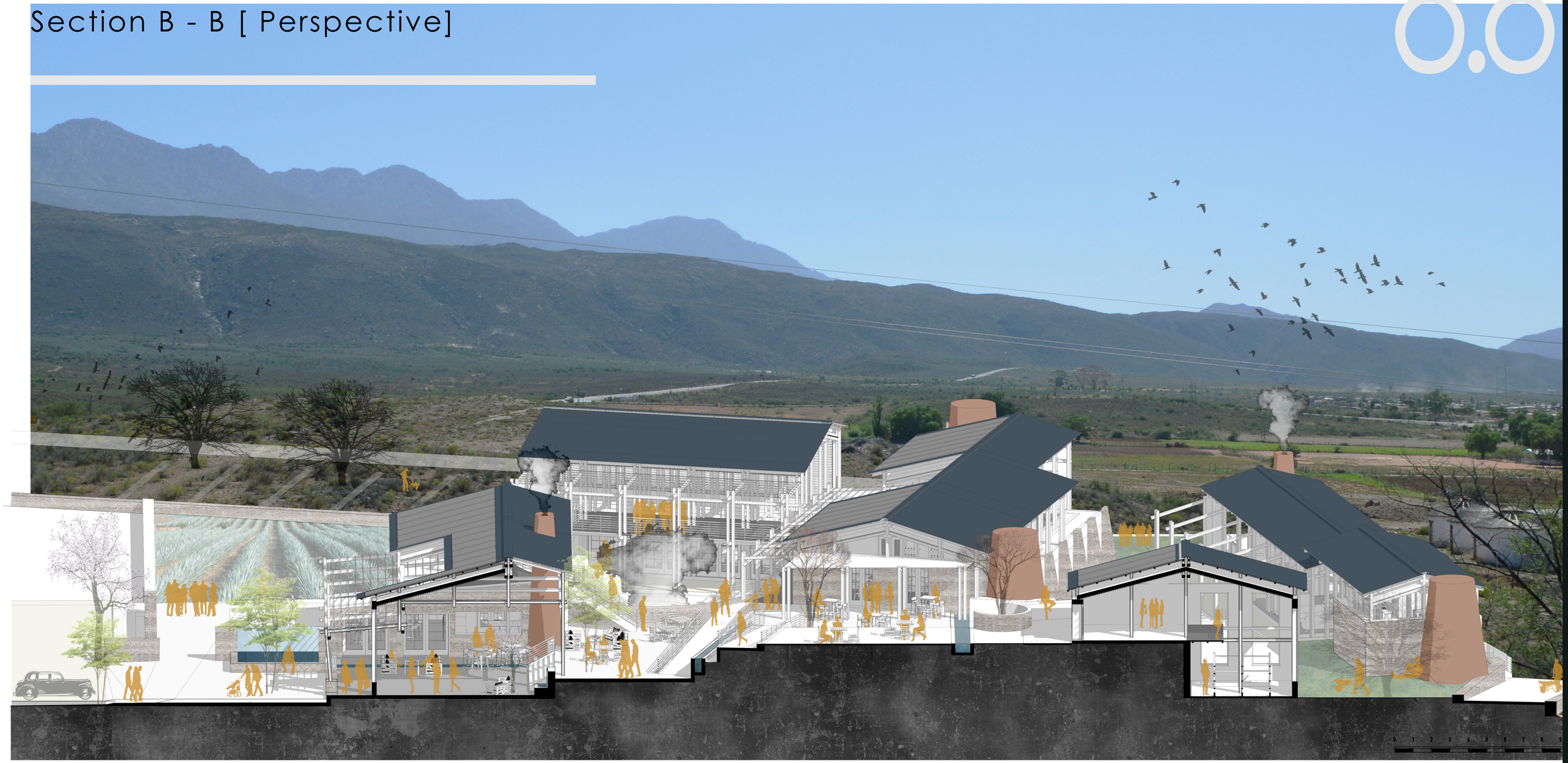
[axonometric]



*All the Popilier Timber work to be Tanalith pressure treated.

Section B - B [Perspective]

8.8



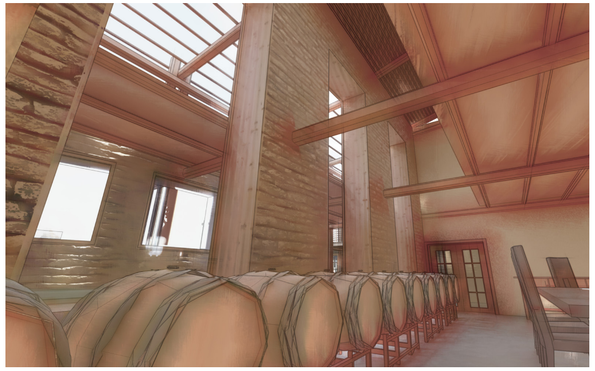
Main entrance from parking area.

Sisal fibre production with corbelled inspired water storage structure emerged into landscape.

Central courtyard on a rainy day in the Klein Karoo.

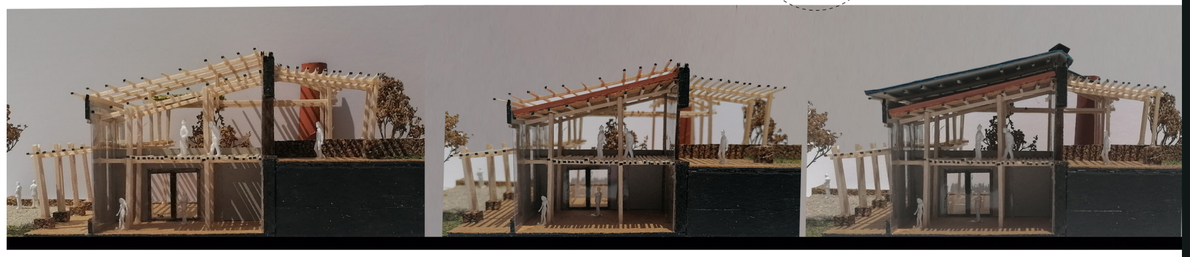
North-west: Front of building.

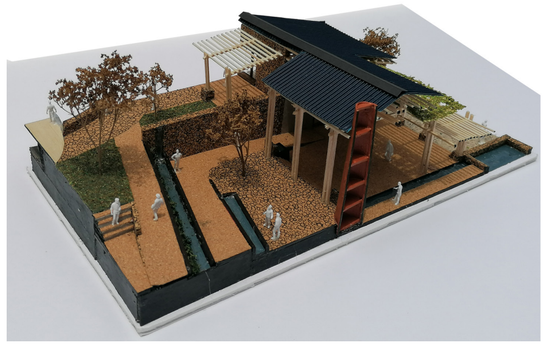
'Padstal', sit down space.
Bakery & Smoothie bar.

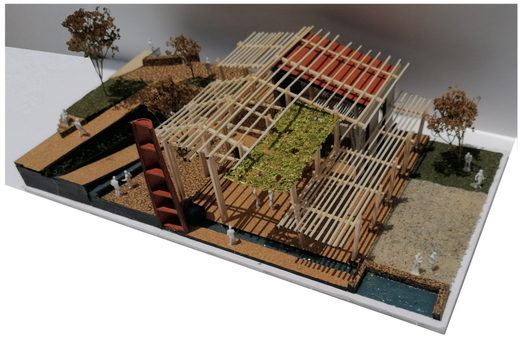


Tasting and barrel aging.

Sectional Model





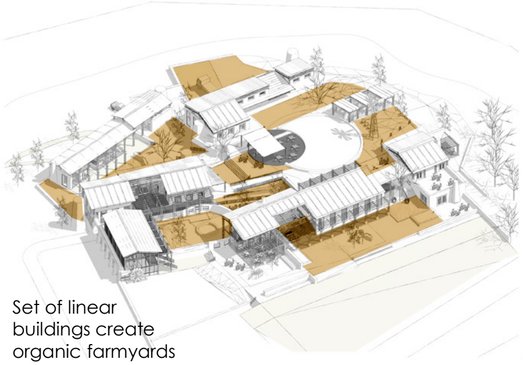


Design Aspects

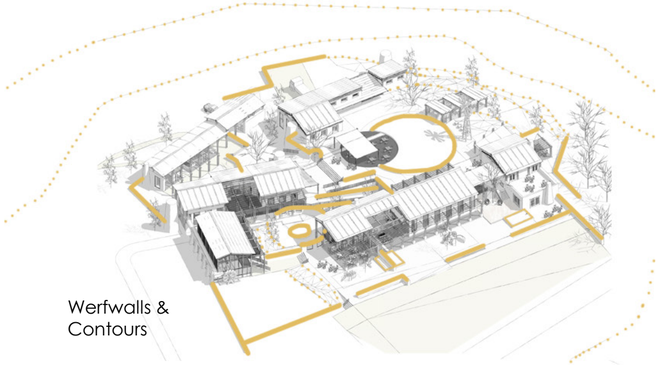
8.10

Zones

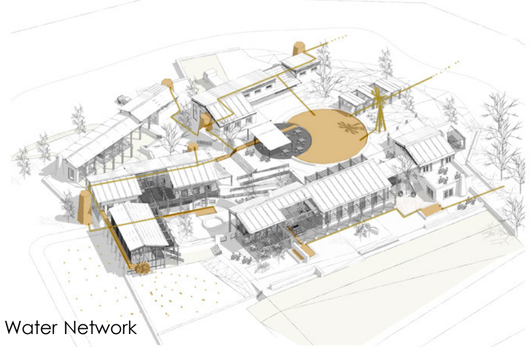
Movement



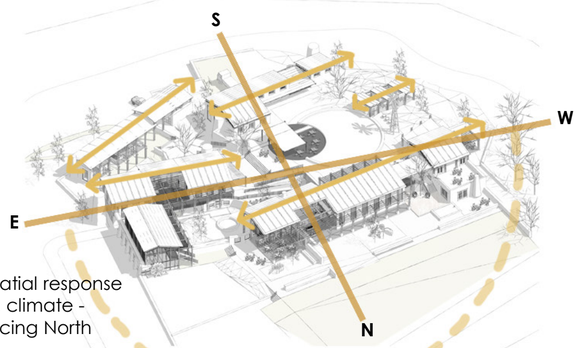
Set of linear buildings create organic farmyards



Werfwalls & Contours

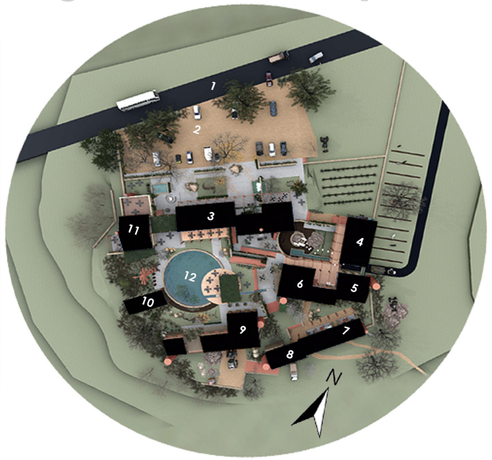


Water Network



Spatial response to climate - Facing North

[Layout of the buildings on the site]



KEY

1. Route 62
2. Parking Area
3. Padstal
4. Mezcal Working House
5. Still House
6. Bar/Tastings
7. Artisinal Materia Medica
8. Animal Fodder Fermentation
9. Artisinal Sisal Crafts
10. Greenhouse
11. Organic Farm Kitchen
12. Existing Concrete Farm Dam

C

“part c”

END NOTES

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Figure 7.14 : June 2
Source: Author (2020).

Chapter 08 - Final Design

All images by Author (2020)

DESIGN TREATISE LANGUAGE PRACTITIONER DECLARATION
Please type or complete in black ink
FACULTY: Arts
SCHOOL/DEPARTMENT: Architecture

I, (surname and initials of language practitioner) **Smith JC**

Being the holder of the following qualifications (e.g.: BA (English)

Experience: Features writer at the Herald (12 years);
national magazine features writer (9 years to present);
NMU Writing Centre Respondent (2011);
SACE registered educator.

Certify that I am the language editor for (surname and initials of candidate)

Conradie I

(student number) 12167022712 a candidate for the degree Master of Architecture (Professional), with a treatise entitled (full title of treatise):

Strategies for the Regeneration of Degraded Rural Landscapes: The Design of a "Padstal" on the Crossing of Route 62 and the Seweweekspoort Pass, Klein Karoo

Hereby certify that I have edited the language usage in his/her design treatise document in its entirety and believe that it is ready for examination.

Julia C. Smith

LANGUAGE PRACTITIONER Date: September 9, 2020

Conradie

STUDENT Date: September 9, 2020

[The End]