

THE CONTEMPORARY CAPE WINERY: A WINE COOPERATIVE FOR JAMESTOWN,
STELLENBOSCH

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THIS DISSERTATION IS PRESENTED AS PART FULFILLMENT OF THE DEGREE OF MASTER OF ARCHITECTURE
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ABSTRACT

TITLE

The Contemporary Cape Winery: A Wine Cooperative for Jamestown,
Stellenbosch

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M.Arch (Prof) UCT 2014

This dissertation aims to engage critically with the commercial wine estate typology in the Stellenbosch wine region in the Western Cape.

The social problems faced by farm workers in the region calls for a re-interpretation of the winery typology to ensure a more socially sustainable future for the viticultural industry in South Africa. In order to achieve this, the general state of the commercial wine estate in the region will be read in relation to aspects such as heritage, social responsibility and spatial relationship to urban areas and farm worker communities.

To develop this new typology, a site with agricultural potential and a direct connection to an urban farm workers settlement will be used. The potential of the urban environment will be analysed in relation to the existing facilities in the community to determine a solution for a new typology of winery which will bridge the divide between community and the farm in such a way where it will be beneficial for both and through this create a new social structure for the wine estate. The possibility of an densified wine cooperative will be investigated.

The design will consist of a large scale urban framework for the wine cooperative and a detailed design of the winery within the context of the new cooperative.

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INTRODUCTION

The primary concern that prompted this dissertation is the architectural representation of the contemporary wine estate in the Stellenbosch area. The consumer culture associated with the tourist trade in the South African wine industry is leading to an architectural expression that is seemingly created for the enjoyment of the visitor, catering for their romanticised ideas of what the wine industry entails. The social reality of the viticultural industry however is still very different from the idealistic image created by commercial wine estates. Many estates are still governed by a paternalistic social structure and together with the advancements in technology, the unemployment rate of seasonal workers on farms is the cause for many social ills developing in the farm worker community, forced to reside in more urban areas due to lack of housing on farms.

This dissertation will critically examine the architectural and spatial state of the contemporary Cape wine estate in relation to the social conditions of the workers in general in order to gain a better understanding of the dynamic.

The ultimate goal of this project is to develop a new winery typology in Stellenbosch which still caters for the tourist market, but through doing so creates better living and working environments for the workers and community affected by the associated social problems of the current wine industry.

01 CONTEXTUALISING THE WINERY

1. CONTEXTUALISING THE CAPE WINERY

In order to design a new typology for a winery, the context in which the current typology developed must be understood. By analysing the architecture of the wine industry through Contextualism, one will engage in different aspects of the architecture, ranging from the early vernacular influences to the effects that the commercialisation of the industry had on the architecture.

a. Contextualism

The term context comes from the Latin word *contexere* meaning to merge together. A contextually responsible architecture can be argued to be a unified whole that represents and gives built expression to all the contextual factors of the immediate surroundings, both socially and physically.

Contextualism can be seen as a set of values which distinguishes architectural works and is manifested in three kinds of architecture¹, namely vernacular architecture, critical regionalism and regionalism. The following section will look in particular to vernacular and critical regionalism in relation to the Cape wine estate to come to a better understanding of what the context of the contemporary Cape winery should entail. Through understanding this it will be easier to create a more regionalist approach to architecture for the wine industry, which will be the main objective of this dissertation.

¹ El-Shorbagy, A. 2011. *Contextualism: Architecture and Context*

b. Vernacular: The interrelationship between *terroir* and the built environment

Terroir is a term adapted from the French word '*terre*' meaning 'of the land' and is used in agriculture, specifically in viticulture, to describe the unique set of environmental conditions inherent to a very specific area which gives the final product very particular characteristics. Seen in terms of pure agricultural activity, devoid of any economic or cultural readings, *terroir* focuses on the physical, the soil, the climate and geography, making sure that the best area for the production of vines are selected to get the optimum product.

The concept of *terroir* can thus be interpreted to have an inherent sense of place or 'placeness'² that is deeply dependable on its surrounding environment to shape it and staying true to the [natural] forces influencing it.

Terroir is a composite of many physical factors...as well as more intangible cultural factors. Matt Kramer once very poetically defined terroir as "somewhere-ness," and this I think is the nub of the issue. I believe that "somewhere-ness" is absolutely linked to beauty, that beauty reposes in the particulars.

(Grahm, 2006).

² Mouton, G. 2006. *Terroir: The Footprint of Great Wines*, p.4

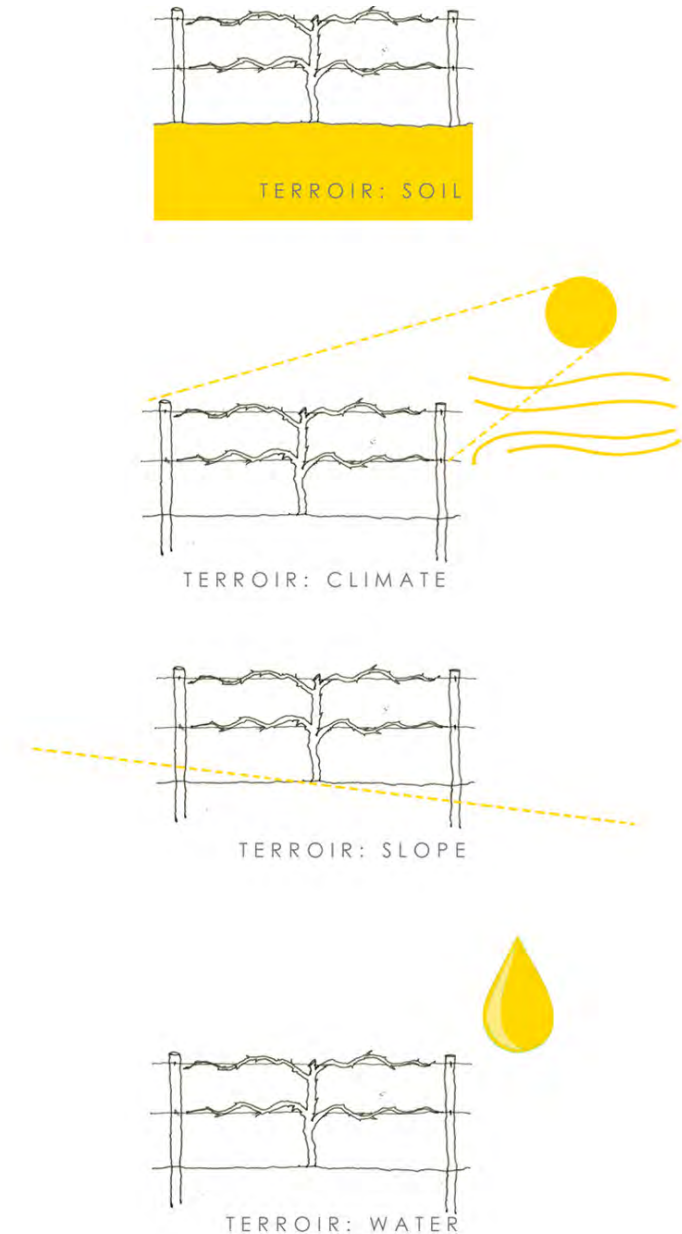


FIGURE 1 (ABOVE): A graphic illustration of the components of terroir. (Author)

Even the most scientific interpretation of *terroir* thus cannot be read in a vacuum, devoid of any cultural, social or historical influences.

Paul Vidal de la Blache, a French geographer from the 19th century, states the following on the idea of *terroir*: "... how can the history of a people be (or must be) incorporated in the soil? The rapport between the soil and the people is imprinted with an ancient character that continues through today."³

The characteristics of *terroir* has thus influenced and shaped man's interaction with the land to create the optimal methods of farming the ideal product. The influences of the community, together with the physical aspects of *terroir*, should start to create a cultural *terroir* where land and community both contribute to and gain from the landscape.

Amy Trubek, author of *The Taste of Place*, writes that *terroir* should reflect reality⁴ and should describe and alter people's relationship to the ground. This reality however does not just speak about the ultimate geographical location of the winery or the perfect balance of minerals in the final product, but should tell the true story of the community involved in the process.



FIGURE 2 (ABOVE): Illustrating the components of the cultural landscape of the Stellenbosch wine country. The top row shows the perceived characteristics of the area and the industry, whereas the bottom row illustrates the changes in the nature of the viticultural landscape.

³ Trubek, A. 2008. *The Taste of Place: A Cultural Journey into Terroir*, p.23

⁴ Trubek, 2008:18

When thinking of the architectural heritage of the Cape wine farm, an image is immediately conjured up of the Cape Dutch homestead; the beautiful whitewashed buildings dominating the tranquil vineyards and natural surroundings.

An architectural vernacular is not a singular 'style', but is an architectural response to physical and cultural influences that occur within society. It starts with a bare essential approach to technology as it had to start when technology and material choices was limited.

It is the same condition for the Cape vernacular tradition. It started out under the Dutch rule with the European idea of settling and built form, but was strongly influenced by the materials locally available, and the limitations thereof. Walls were adobe walls, whitewashed with lime, one room deep floor plans due to the limited sizes of natural timber available and thatched roofs, inspired by the traditional Khoi-Khoi huts⁵.

Climatic conditions also differentiated the architecture in the Cape from that of its European source. The warm summers necessitated the use of large, airy and lofty rooms covered with heavy thatch roofs to keep the rooms cool and shuttered windows which keeps the heat out during the day. Generous 'stoeps' in front of buildings are shaded by large oak trees.

FIGURE 3 (RIGHT): An example of an early Cape vernacular farm shed on Zandfliet, the unadorned central gable highlighting a part of the building where the strong reliance on local natural resources for building becomes clear. Later additions to the sides of the building can be clearly distinguished from the old through the use of decoration. (Stellenbosch Dorpsraad. 1929)

⁵ Van der Meulen, J. May 1963. *Northern European Origins of South African Colonial Architecture*. Journal of the Society of Architectural Historians, Vol. 22, p.52



From this simple vernacular architecture developed a new spatial layout and architecture for the Cape wine farm. The binding feature on the wine farm evolved as the 'werfmuur', a low, whitewashed adobe and stone wall built around the perimeter of the manor house and all the outbuildings, defining an enclosed farm yard (werf) used as an additional practical space on the farm and defining structured ownership over the natural landscape. On a typical Cape wine estate such as Groot Constantia or Buitenverwachting, the buildings found within the confines of the 'werfmuur' are the manor house, the wine cellar, 'Jonkershuis' or manager's house, stables and the slave quarters.

The arrangement of the buildings on the Cape wine farm forms part of the spatial language of the vernacular: the domination of axially and ordering over the natural landscape.

The visual distinction between residential and agricultural buildings on the farm was almost nonexistent as both were built using the same vernacular principles and technologies. The house and winery thus had a similar architectural language, not through applied aesthetic, but through responding to the environment in a responsible manner. This similar built form that emerged for two radically different programmes (house and cellar) gives legitimacy to the purity of the vernacular and it is that which gave the Cape viticultural industry an identifying style of architecture that would form the basis of the agricultural built heritage.

FIGURE 4 (RIGHT): Illustrating the sameness in character between buildings with different typologies (house, winery, stables) built in the Cape Dutch. The influence of the vernacular is clearly visible through the building technology. This clearly shows the climatic responses of the vernacular style. (Stellenbosch Dorpsraad. 1929)



Groot Constantia Site Analysis

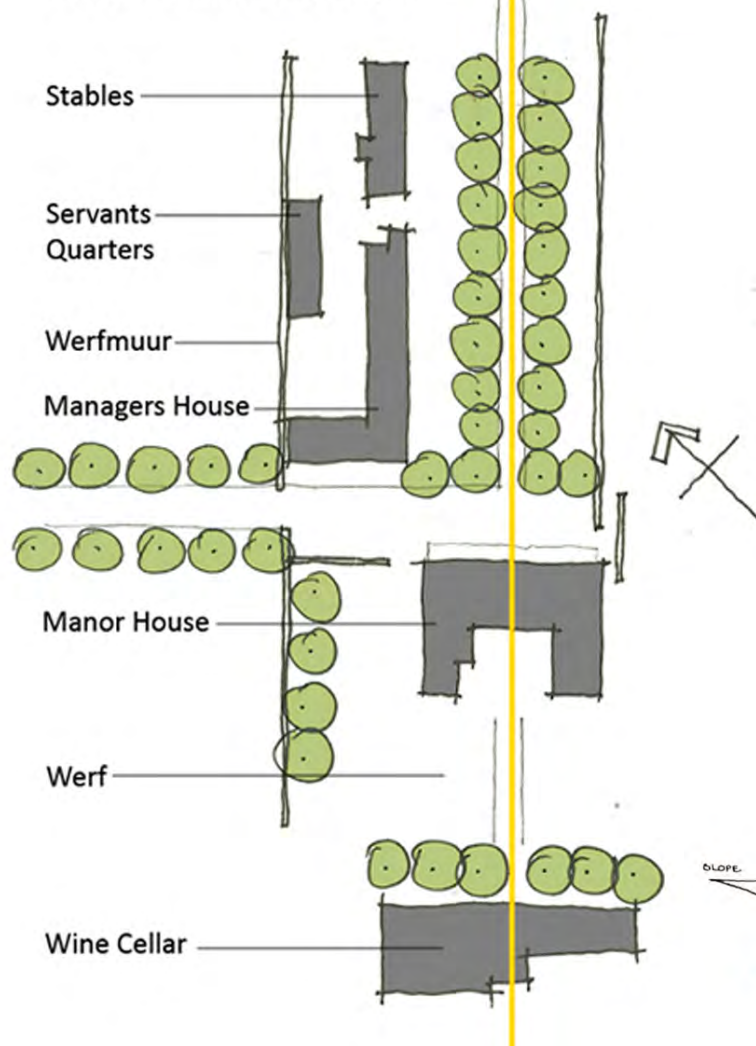


FIGURE 5 (ABOVE): The dominant axiality of the Groot Constantia wine estate in Cape Town is clearly visible and the spatial configuration with the supporting facilities being placed separate from the manor house and winery, yet being tied together with the use of 'werf' walls. (Author)

Buitenverwachting Site Analysis

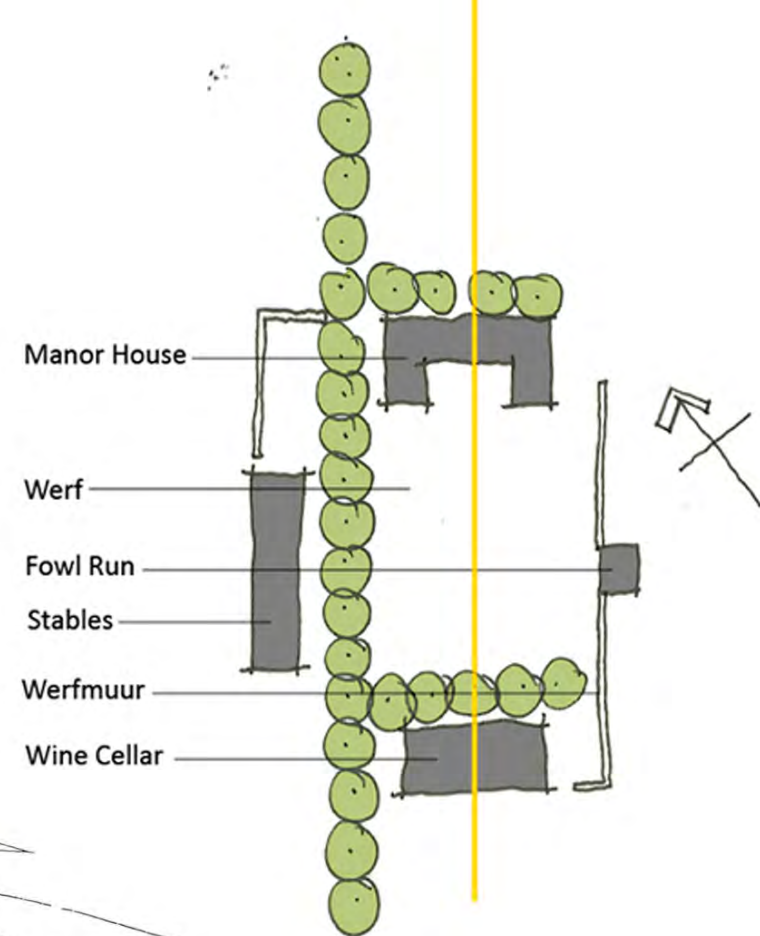


FIGURE 6 (ABOVE): The spatial configuration of the functions on this farm creates a clearly defined 'werf' in the centre, an defensible external working space. The use of werf walls clearly define this space. The traditional north-south axial alignment of the manor house with winery is also evident. (Author)

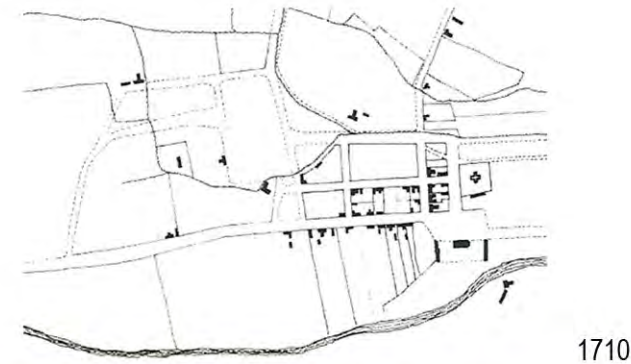
In the urban form of early Cape settlements such as Stellenbosch, the blurring line between town and landscape – town and farm is also evident. The town was established to service the farms in the area which settled there due to the ideal conditions for viticulture. The urban form of the town itself started out as *watererven* or water plots along the Eerste River and soon these rows of farm buildings along the road created a more urban frontage from where the rest of the town developed. The town thus grew out of the character of the landscape – the *terroir* that made it suitable for viticulture and also led to the implementing of the vernacular.

The Cape Dutch building can thus be seen as an example of a vernacular that developed out of its surroundings of which the purity, response to place, technology and culture still influenced the thinking of architects through the Modern Movement and beyond in South Africa. As Rex Martienssen, pioneering Modern architect in South Africa, noted:

Picture a Cape Dutch farmhouse. Thatch and whitewash. Oak trees screening the open stoep. Then wide, green doors, windows delightfully proportioned, and great tiles covering the floors. There is nothing inconsequent about these elements, these materials. They arose from a divine instinct for what is good, from sure knowledge of the fundamentals of fine building.

(Martienssen, 1928)

FIGURE 7 (RIGHT): The expansion of Stellenbosch over a 200 year period from its founding. The language of the 'watererven' along the banks of the Eerste River was one of the driving spatial determinants of the town shape. The connection between these plots and the river has been completely destroyed by contemporary development, stripping the town centre from its historic agricultural characteristics. (Swilling, B. 2012)



1710



1810



1910

c. Critical Regionalism and the Post Modern - Fabricated Realities of the Contemporary Wine Estate

Since 1990 the South African wine industry started to claim a larger stake on the international wine market, where farms are not only competing with other local wine producers, but against large and century-long established wine regions from around the globe⁶. In many instances this added level of competition took it out of the reach of one owner/family to support a wine farm financially and has led to the farm being managed as a corporation with many different commercial aspects, such as restaurants, hotels and conference venues incorporated into the business model to give larger market exposure to the wine. A foreign aesthetic approach to architecture is often appropriated by an estate to distinguish itself from others and align it with the tourist industry perceptions of what life on a wine estate is like.

Romantic association with the wine industry has led many farms to implement the idealistic lifestyle image as a branding opportunity for the estate and its wine, sometimes 'importing' foreign vernaculars such as Tuscan to the Cape wine estate in order to sell a lifestyle image.

This stylistic expression of architecture on the wine farm has led to a viewing of the architecture where the authenticity of the vernacular has come under threat to promote the idealistic lifestyle of the estate to the tourism industry as a form of branding for the estate.

⁶ Fraser, H. 2010. Modern Wineries of South Africa, p. 6

This reduction of the authentic vernacular into a style which represents a foreign vernacular (Tuscan) is leading to the commoditization of a culture where the image of the lifestyle outweighs the true cultural and social influences that should shape the architecture.

Alan Lipman noted in a lecture at the University of KwaZulu-Natal⁷ in 2003 that through the search for individualism, personal branding/expression and the need to resist the alienating sameness of traditional built forms, society has become culturally polluted. The pillaging of other cultures' histories and styles to find a unique expression of self-interest is leading to a Post-modern architecture with 'screaming signs' stuck onto buildings to promote individual character and as a result is leading to a built environment with no contextual grounding.

There are numerous examples of Cape wine estates that employ the use of a foreign vernacular to use the visual association of that style as a way of distinguishing itself from the rest. Looking at four different wine estates around Stellenbosch, namely Morgenhof (a commercial wine estate with restaurants, conference venues and winery), Waterford (a winery with tasting facilities and restaurant), Kleinoord (small winery with tasting facility) and Edgebaston (production winery only), it became evident that the level at which the tourist and process is integrated plays a major role on the architectural expression of the space and the authenticity of the architectural response to function. The closer the relationship between grape, production and visitor is, the more pure or true to function the architectural expression becomes.

⁷ Lipman, A. 2003. *A South African architecture: What is it? Where is it?* Paper presented at Harold Wolpe Lecture Series



Morgehof Wine Estate, Stellenbosch
- Separated tourist and farm/factory -

Note the French style architecture utilised to create an atmosphere for the enjoyment of the visitor, with no acknowledgement to how the farm operates. The aesthetics of the buildings are thus not influenced by function of vernacular traditions.

Photos by author



Waterford Wine Estate, Stellenbosch
- Semi-separated tourist and farm/factory -

The tourist function of this farm, the tasting facilities is integrated with the winery, but a foreign architectural style was imported to idealise the setting and function of the winery.

Exterior photo (above) by author, interior photo by H. Fraser 2010





Kleinoord Farm, Stellenbosch
- Integrated tourist and farm/factory -

The tourist experiences first-hand the production methods of the wine as the tasting facilities are directly placed inside the winery. The architectural expression related to the industrial nature of the winery through using shed structures and incorporating vernacular building traditions to enhance the surroundings.

Photos by author



Edgebaston Farm, Stellenbosch
- No tourist, just farm/production -

As there are no tourists to take into consideration, the architecture solely expresses the functional needs of the winery.

Photos by author

Hugh Fraser commented on the Tuscan 'villa' style architecture of the Waterford winery and noted the Californian feel thereof, belied by the presence of the Helderberg mountain range in the background, a physical landscape not generally associated with traditional Tuscan farm villas.⁸ It is not only stylistically where the true nature of the farms gets belittled, but in also in the involvement (or lack thereof) of the community or worker and tourist in the experience and process of wine making.

This spatial configuration of these romanticised architectural styles is then in a way still keeping alive the out dated social practices on farms. The paternalistic social structure found on many wine farms in the region originated in the late 17th century with the introduction of slave and Khoi labourers on farms. The farmer was seen as the lord and controlled all the aspects of the farm, the people working for him and their destinies⁹. The farmer held strict control over his workers through physical punishment, using the 'dop'-system as reward and having liberty over the housing situation and tenure of the farm workers. Even after the freeing of the slaves on farms in 1838¹⁰, many stayed on the farms as employees, being dependant on the farmer for housing and remuneration, often still in the way of the 'dop'-system.

In the past 30 years there has been a sharp decline in the number of permanent farm workers living on farms¹¹ with the advancements in technology and automation systems making the need for a large, permanent workforce redundant. In some cases small groups of farm labourers with more expertise knowledge are still resident on the farms, but the majority of the workforce now consists of seasonal workers, living outside of the estate

⁸ Fraser, 2010, 163

⁹ du Toit, 1947; Thesis

¹⁰ Viall, J. et al. 2011. Grape: Stories of the Vineyards in South Africa 1652 – 2011, p115

¹¹ Viall, 2011; 116

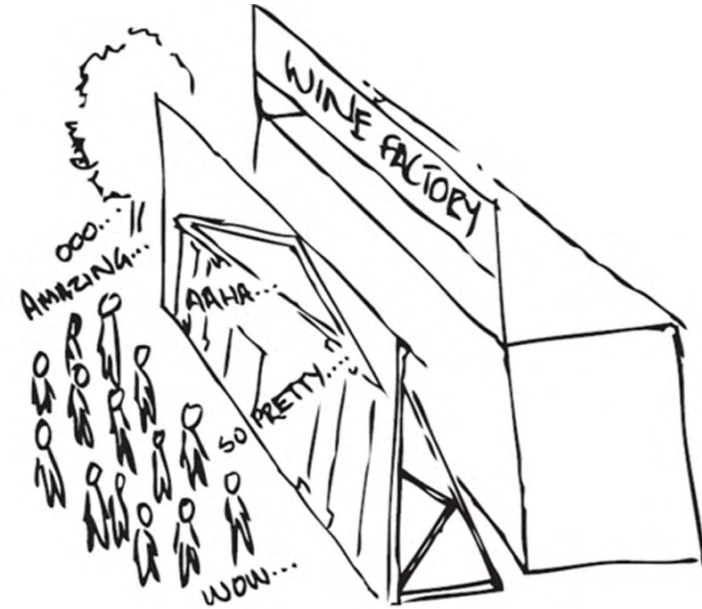


FIGURE 8 (ABOVE): The facade of romanticised styles associated with the wine industry used to mask the true nature and workings of the wine industry. (Author)

and are only employed during harvesting time on the farm where there is a need for more manual labour. For the rest of the year the labourers are left unemployed and having to live in more urban areas away from the farm.

Yet through all these social changes, the perception of the farm image still remained the same: the large and impressive estate dominating the landscape with the presence of the workers being placed on the background. This notion of work force in the background with the architecture setting a stage front for the expectations of grandeur and opulence that is being branded in the wine industry is one that still encourages the paternalistic approach to farm and winery management to continue, placing little or no emphasis on the true working and social structure of the farm. These spaces of fabricated reality often found on wine farms where the pleasure and experience of the visitor is given preference reminds of the notion of the Italian villa or French chateaux, not necessarily in appearance, but in typology where the villa and chateaux is seen as opulent spaces created for the enjoyment and comfort of the owner/visitor with little or no acknowledgement of the everyday processes and social structure involved in farm life. An illusion of prosperity is thus created at the expense of an already centuries long marginalised group of farm workers that is still subject to paternalistic social structures of bygone eras.

The idyllic image of the wine estate has also led to the development of many 'lifestyle' estates around Stellenbosch, selling the image of country or farm living. The architecture of the estate often impersonates the styles associated with the idealistic lifestyle on farms, ranging from Cape Dutch to Tuscan and French Provencal. The urban characteristics of these estate however are completely contradictory to the reality of farm structure and are thus ruining the connection between landscape and urban along the peripheral edges



FIGURE 9 (ABOVE): Walled housing estates eating away at the viticultural landscape around Stellenbosch in such a way that it breaks the connection between the built and the physical landscape - a very important aspect of vernacular architecture. (Google Earth, 2009)

between town and farm. The attempt to imitate the agricultural is thus threatening to destroy the authentic nature of the Cape viticultural landscape.

- d. Regionalism: Creating of a new cultural *terroir* for socially sustainable wine production

While vernacular provides the basic fundamentals for a good architectural response and critical regionalism seeks to respond appropriately to the genius loci of the space, the social aspects of the viticultural industry must be represented in a regional architectural approach.

One example where a new social structure was applied to an existing wine estate is Solms Delta. The owners have taken a serious approach to land reform and social upliftment in the Cape Winelands district. When new owner Mark Solms bought the farm in 2005 he created the Wijn de Caab trust, an equity trust that gives the 200 previously disadvantaged farm workers of Solms-Delta a 33% equity stake in the estate, and the equivalent revenue of wine sales goes directly to the employees. This trust has given the farm workers the necessary financial security to buy land from a neighbouring farm that they then work themselves and thus also becomes suppliers to the winery, forming an active part in the running of the estate and thus having a feeling of ownership over the finished product.¹² Yet the spatial and architectural configuration of the farm still creates the impression where the tourist experience is given preference over the inclusion of the worker in the public spatial planning of the estate.

¹² Ruddock, F. 2012. Capacity Building for Farm workers on Solms-Delta: A Social Development Perspective, p. 55

The architectural expression of the estate should then be one that acknowledges the complete range of social and cultural influences that it draws from and affects. The possibilities of the winery as vehicle of social change and cultural inclusivity in the viticultural and agricultural industries should be explored in order for the wine estate to not merely benefit the label it supports, but can lead to the betterment of the entire community it involves.

The cultural *terroir* of the contemporary winery should thus incorporate interpretations of vernacular architecture that is relevant for modern materials and processes, and should do away with the incorporation of culturally irrelevant styles that are threatening the heritage of the Cape viticultural industry. Local social and cultural references should be drawn from to create a more socially sustainable winery typology for the future.

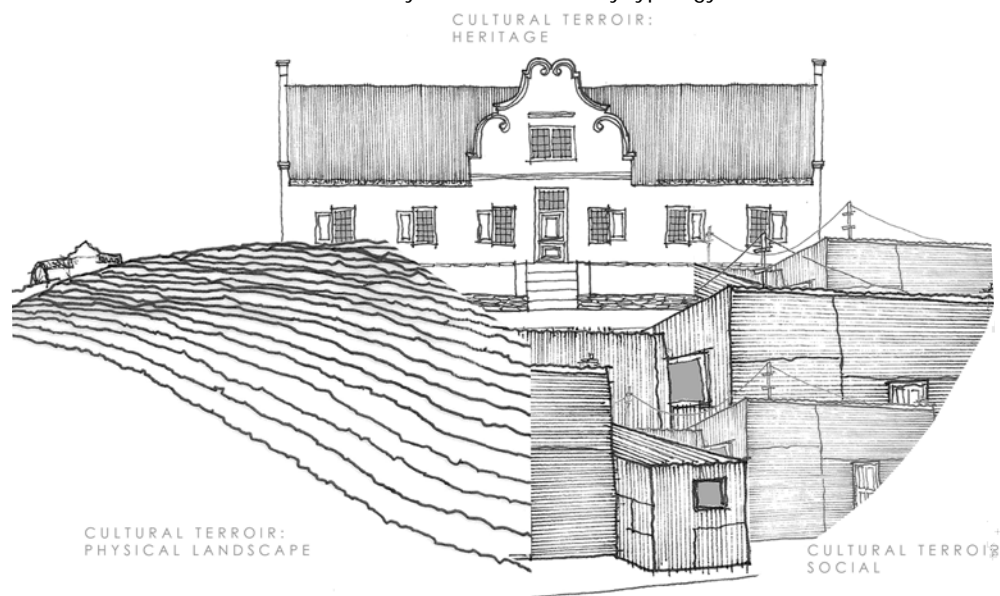


FIGURE 10 (ABOVE): Illustrating the different aspects of the viticultural industry playing a role in the development of a new winery typology: heritage, social practices and the physical landscape. (Author)

02 SITE ANALYSIS & PROGRAMME

2. SITE & BRIEF

The outdated social practices of the viticultural industry needs to be addressed architecturally in order to develop a more sustainable social winery model for the future. Management changes in the farm structure such as that on Solms Delta does give monetary recognition to the worker, but the hierarchical architectural representation of the estate still places the presence of the worker in the shadows of the visitor and owner.

Through enhancing the experience of the visitor on the farm will automatically start to generate a better understanding of how the farm operated, how the grape is produced, sourced and processed into a final product and what the social circumstances of the reality of the viticultural industry is.

a. Site Background

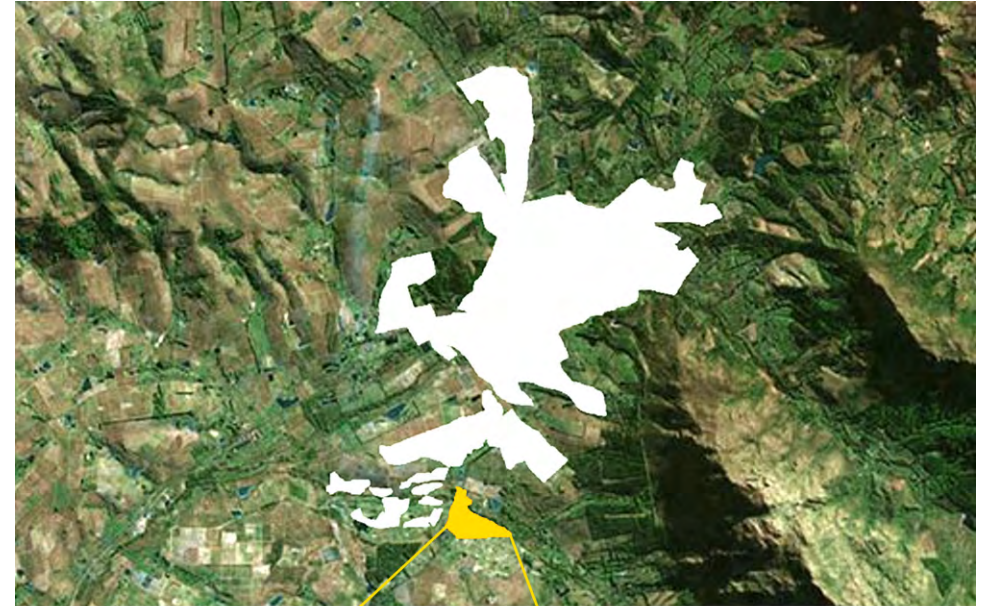
The site for a project that calls for the reinvention of the existing wine estate model should thus be located in a less traditional setting than the romanticised idea of a wine estate. The site selected is in Jamestown, a small rural settlement with a population of 2840 people located 8km south of Stellenbosch.

Jamestown was found in 1882 when Stellenbosch businessman James Rattray (1859-1938) bought a piece of land from the Blaauwklippen wine estate. He divided the land which bordered the Blouklip River into *watererven* and sold it to coloured families (mostly freed slaves from surrounding farms) for subsistence farming. Most families paid off their piece of land within 20 years. As time progressed the families started to sell off portions of their lots that were further away from the river, resulting in a more suburban character to develop along the main road, Webersvallei Road.

The 1970's saw the first tarred road in Jamestown (Webersvallei Road) and also the introduction of electricity to the area. Today the village has 2 churches, 2 schools – Webergedenk Primary School and Stellenzicht Secondary School, a public clinic, a post office, a general dealer and communal sports grounds shared by the two schools.

FIGURE 11 (TOP RIGHT): The location of Jamestown in relation to Stellenbosch. (Google Earth, edited)

Figure 12 (Bottom Right): An aerial view of Jamestown (Google Earth)



Above: Location of Jamestown relative to Stellenbosch.





FIGURE 13 (LEFT): Existing facilities in the community. (Author)

Post apartheid the area experienced major rezoning and development as the wealthy property market recognised the rural beauty of the village. Luxury housing estates such as Le Clemence started to consolidate some of the historic *watererven* to create a security estate and Stellenbosch Square, a shopping mall complex that is completely out of scale in the small settlement was built between the village and the main road, the R44 connecting Stellenbosch and Somerset West, cutting off a visual connection between the road and the town. Through these developments that are trying to brand and sell the image of rural country living, the village is being cut off from surrounding farms by estates and developments such as Aan de Weber Estate and De Zalze Golf Club and Estate, causing it to lose its character as a village with agricultural start and history.

It is however not only the wealthy population and development of the area that is increasing. The population of seasonal farm workers and workers from surrounding farms without housing is growing steadily as they are settling in Jamestown due to its proximity to surrounding wine estates with a hope of gaining employment in the area. As a result of the lack of employment on neighbouring farms, the unemployed workers have started to create community vegetable gardens on open lots in between houses in the village.



FIGURE 14 (TOP): Developments threatening to destroy the agricultural identity of the village by consolidating and developing the historic plots along the river. (Author)



FIGURE 15 (ABOVE): A community vegetable garden established in the village for use by seasonal farm workers. (Author)

b. Site Analysis

The site consists of 34 *watererven* / *subsistence plots* that borders the Webersvallei River as one side and Webersvallei road on the other and totals 32ha in size. Currently on the site are six houses still in use, one abandoned house, a post office and an agricultural academy, the AgriAcademy, which utilises four of the plots and has existing buildings (refurbished houses) used as teaching facilities and student accommodation. Four plots are being used by the current owners for private agricultural use. The other lots are either abandoned or not utilised for agricultural purposes and standing empty.

Topographically the site slopes gently toward the river from the road side, except for the sudden three meter drop along the road edge. This elevates the road above the site, giving spectacular views over the site, Blaauwklippen estate across the river and Stellenbosch Mountain in the distance.



FIGURE 16 (ABOVE): The thirty plots on which will be focussed as a site.

The site has excellent conditions for viticulture. Having originally been part of the Blaauwklippen wine estate (award winning wine producer), it has a soil type known as Hutton which is especially favourable for growing wine grapes due to its composition derived from granite with a good ratio of clay to sand to form a structureless¹³ soil with good drainage.

The site is on a north facing slope and shielded from strong south-east winds by a hill to the south of the site where the largest part of village sits, meaning there are no strong winds to damage the grapes, but only a light cooling breeze during the summer months. The site is more exposed to north-westerly winter winds which would not affect grape production as the vines are dormant from May to August. The agricultural history of the site is also still evident in the remnants of an old *leivoor* water system on a part of the site.

¹³ www.capehutton.com/wyma



FIGURE 17 (ABOVE): Existing leivoor system used by subsistence farmers on neighbouring site.

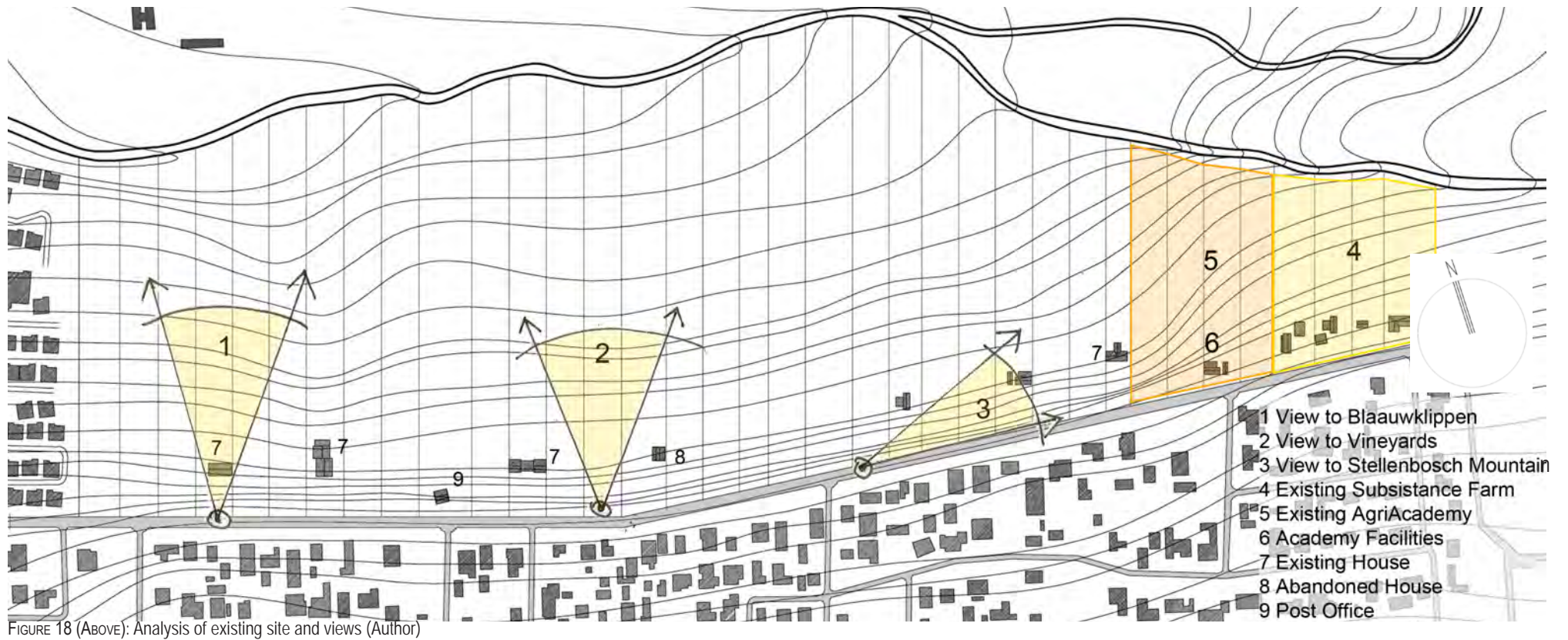


FIGURE 18 (ABOVE): Analysis of existing site and views (Author)



FIGURE 19 (ABOVE): View across the site to the Blaauwklippen Estate(Author)

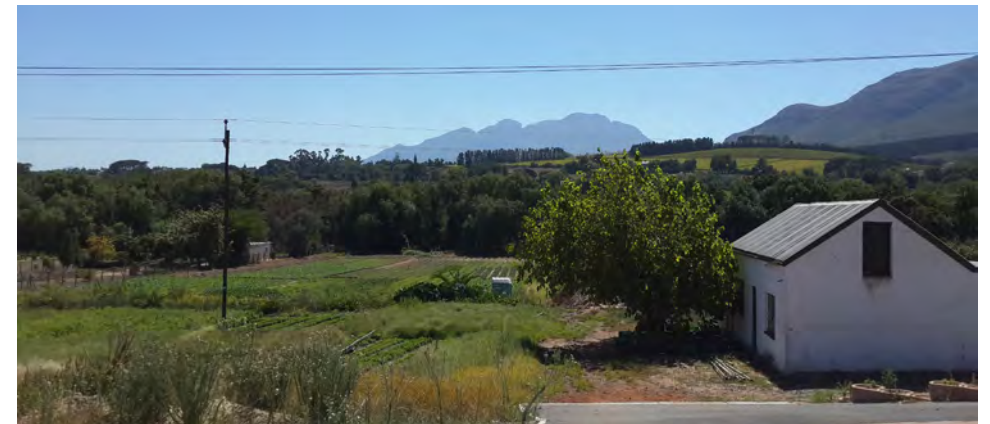


FIGURE 20 (ABOVE): View to Simonsberg in the distance and Stellenbosch mountain in the foreground (Author)

c. Brief & Accommodation

The project will be a wine cooperative for the Jamestown area, utilising the existing layout of the watererven as inspiration to form a new type of social structure for wine production in the Stellenbosch area where worker and visitor will have a more integrated experience on the farm. The aim of that is to better the living, working and social conditions of the farm worker whilst giving the visitor a more rounded experience of the farm. This will be aimed to be achieved through creating a hybrid wine estate typology between the traditional 'watererven' plots, for its sense of individual ownership over land and the urban qualities of the dense street façade, and the commercial wine estate with its tourist appeal and its potential economic contribution to the community.

Instead of farm workers receiving shares in the farm as company as is the case with Solms Delta, each farm worker/family will receive a plot in the scheme and together all the plots will form the cooperative. The reason for doing this is to give someone who would otherwise not be able to afford an entire farm a sense of ownership over the land. Additional low rent housing will also be provided to cater for other farm workers/seasonal workers in the area in need of housing.

Since it is a cooperative, all the farmers from the thirty smaller plots will share functional facilities found on the traditional farm as these are too expensive and large to build one for each plot and thus divides the cost between all the farmers, making it a more feasible business model. These functions include the winery, administration offices for the cooperative, services such as farm vehicles and vehicle storage/maintenance and storage with delivery areas for large quantities of agricultural supplies and the distribution thereof. The cooperative will have a central management to manage all the facilities.

The existing agricultural academy on the site will be incorporated into the scheme. The reason this programme is incorporated into the scheme is because of its potential to aid seasonal farm workers to gain permanent employment on farms in the surroundings through providing them with more specialised skills in the agricultural sector.

In order for the cooperative to fully gain from the wine tourism industry, commercial functions such as a restaurant, wine tasting and sales, a farmers market, plant nursery and conference facilities will be included.

Since the site for this project is so large, the design will be explored over 2 phases. The first part is an urban scheme for the interface between the site and village and the next part will be focussed on the architectural resolution of one building in the urban scheme.

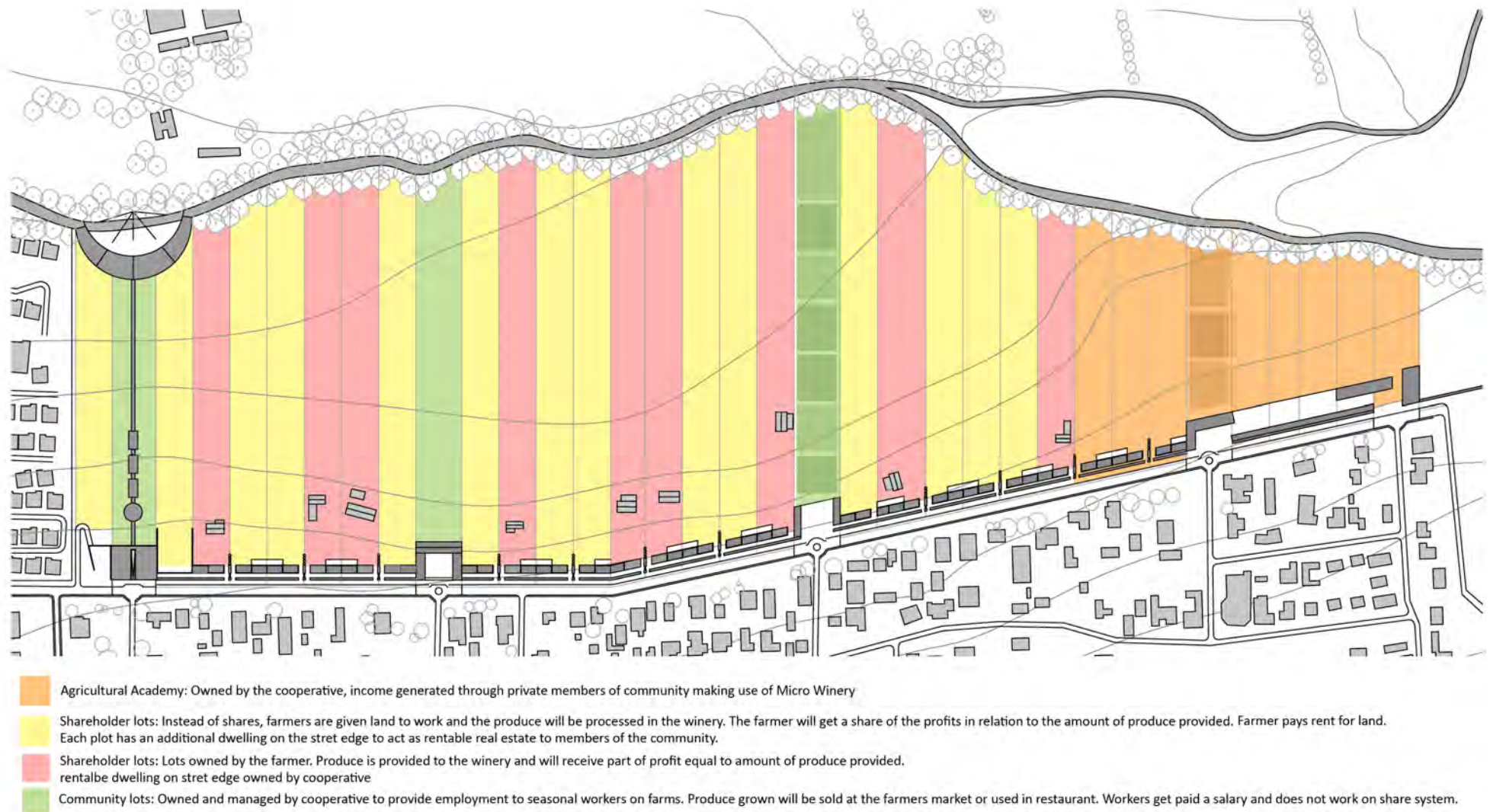


FIGURE 21 (ABOVE): Diagram of intended ownership of the site and management technique(Author)

03 DESIGN EXPLORATION

3. DESIGN EXPLORATION

a. Urban Response

On the more traditional layout of the commercial wine estate, functions aimed at the visitor is often placed on its own and does not relate to the working areas of the farm. This project will aim at creating better cohesion between the visitor and farmer / urban and agricultural relationships by disaggregating the functions of the farm along a more urbanised interpretation of what a farm layout could become. This means the visitor will get a better understanding/experience of the farm as a whole and the better relationship of farm to town will mean that there are more opportunities for season workers currently living in the town to benefit from the relationship between town and farm.

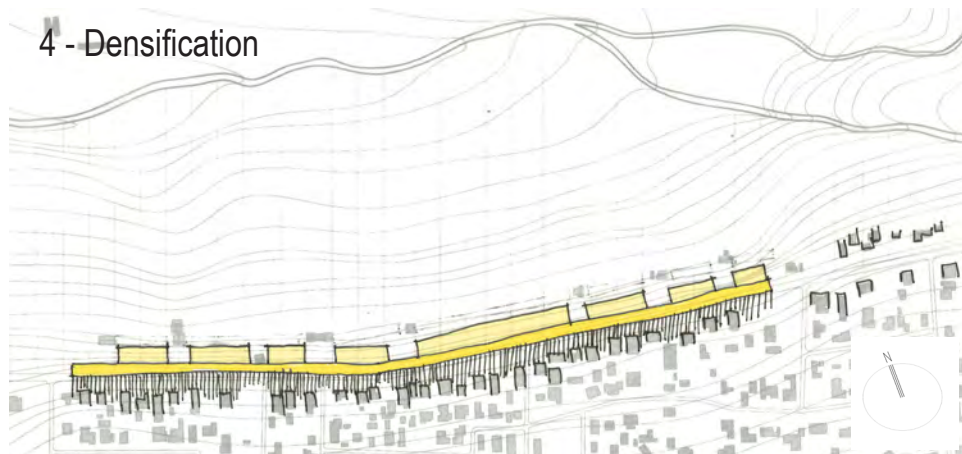


FIGURE 25 (ABOVE): Introducing housing along the agricultural spine will create density in between the existing structures on the site, defining a clearer urban edge between farm and town. Housing will be provided for the farmers related to each plot, as well as an additional house per plot which can be rented to members of the community who wants to work on the farm. (Author)

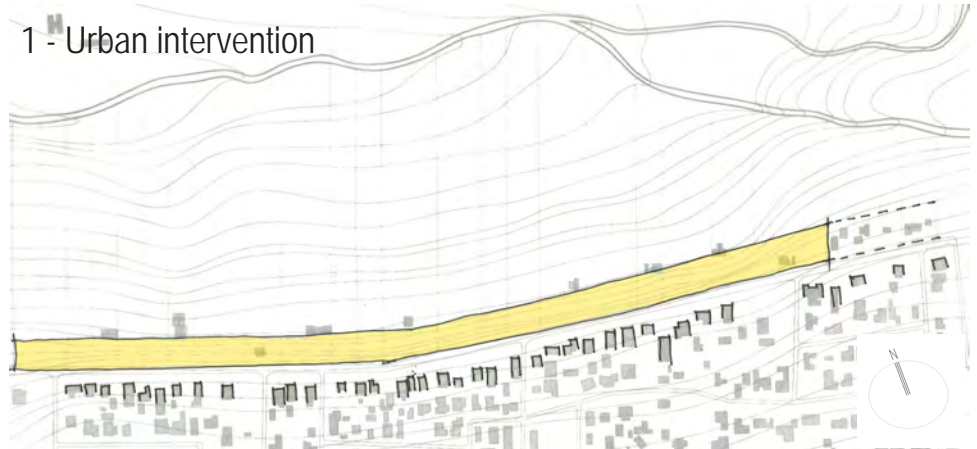


FIGURE 22 (ABOVE): The area identified for development is the sloped piece of land between the existing structures on the site and Webersvallei Road to keep the agricultural land unspoilt. This creates opportunity for a space to develop which addresses both the urban and agricultural conditions. It also falls in line with the 5 houses to the east of the site which will be retrained. (Author)

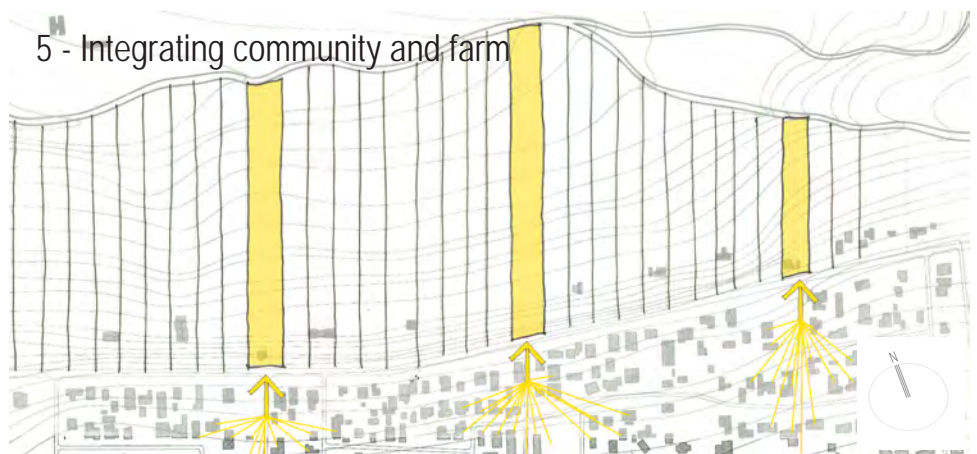


FIGURE 26 (ABOVE): Following from the idea of community gardens that are already established in the town by seasonal farm workers, this scheme will introduced community gardens on a larger scale. Through doing this, one diversifies away from pure viticulture, providing the opportunity for employment for the months during which the vineyards are dormant. These plots will be divided and rented by the cooperative to members of the community to produce vegetables, flowers, fruits etc to be sold at the farmers market. (Author)

2 - Leivoor as development driver

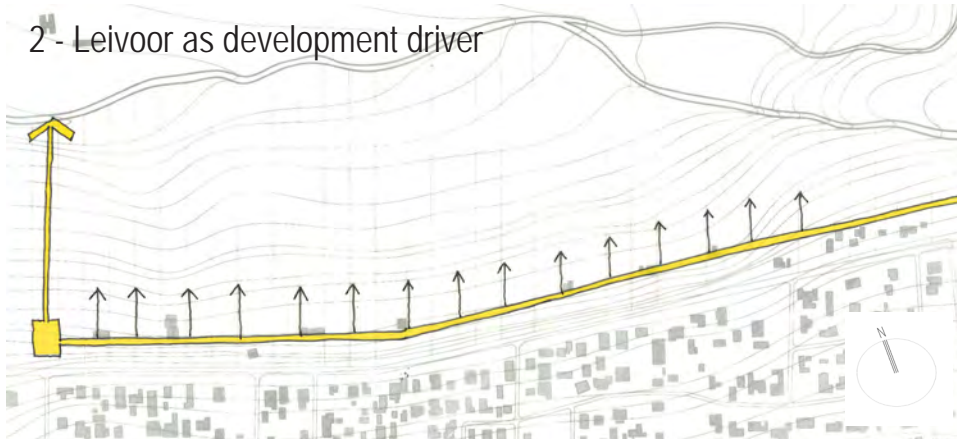


FIGURE 23 (ABOVE): A 'leivoor' system stemming from the Blouklip River will be introduced along the length of the site, providing each of the individual plots with access to water for irrigation. Providing the farmers with access to irrigation water will already make it more viable for them to operate the plots as irrigation will not have to utilise municipal water supply and will thus save on operating cost. The system will end in a natural water filtration plant before it rejoins the river. (Author)

6 - Energy nodes

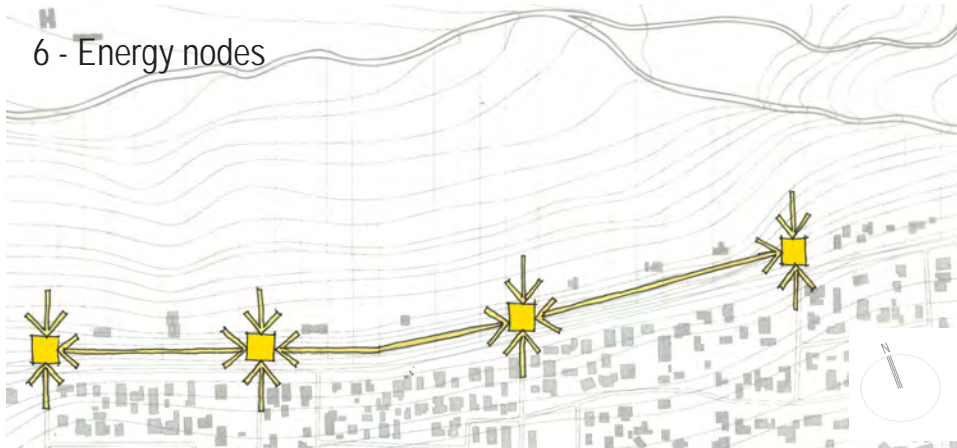


FIGURE 27 (ABOVE): There are four major roads running through the village that intersect the main road running along the site. These points are identified as major nodes along the spine, creating opportunities where the farm, community and visitors can interact. By doing this, the public functions such as the restaurant, wine tasting, farmers market and nursery will be spread out along the site, disaggregating the public aspect of the traditional commercial farm along a route where visitors can experience different aspects of the farm as they progress from one function to the other.

3 - Process / movement spine

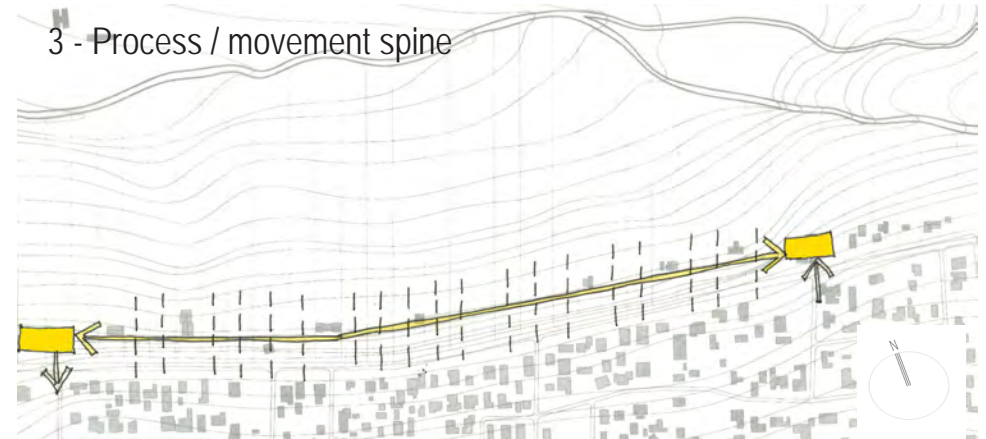


FIGURE 24 (ABOVE): The two major agricultural functions of the cooperative are placed on the far ends of the site, with the service and admin buildings on the east and the winery on the west. This sets an axial functional path across the site along which the different plots will be serviced by these functions. The flow of the process happens in the same direction as the 'leivoor', following the idea of gravity as a spatial determinant, similar to the concept of gravity fed wineries. (Author)

By disaggregating the functions in such a way, the cooperative becomes more than a commercial farm that will only be visited by tourists as a leisure destination, but becomes an integral part of the urban fabric of the town, playing a larger part in the day to day life of the community members and farm workers. These nodes can thus work together to form a complete agricultural experience for the visitor, or each node can function independently from each other, sustaining itself with its public function and service from the farm. (Author)

b. Sketch Design - Mid Year Review

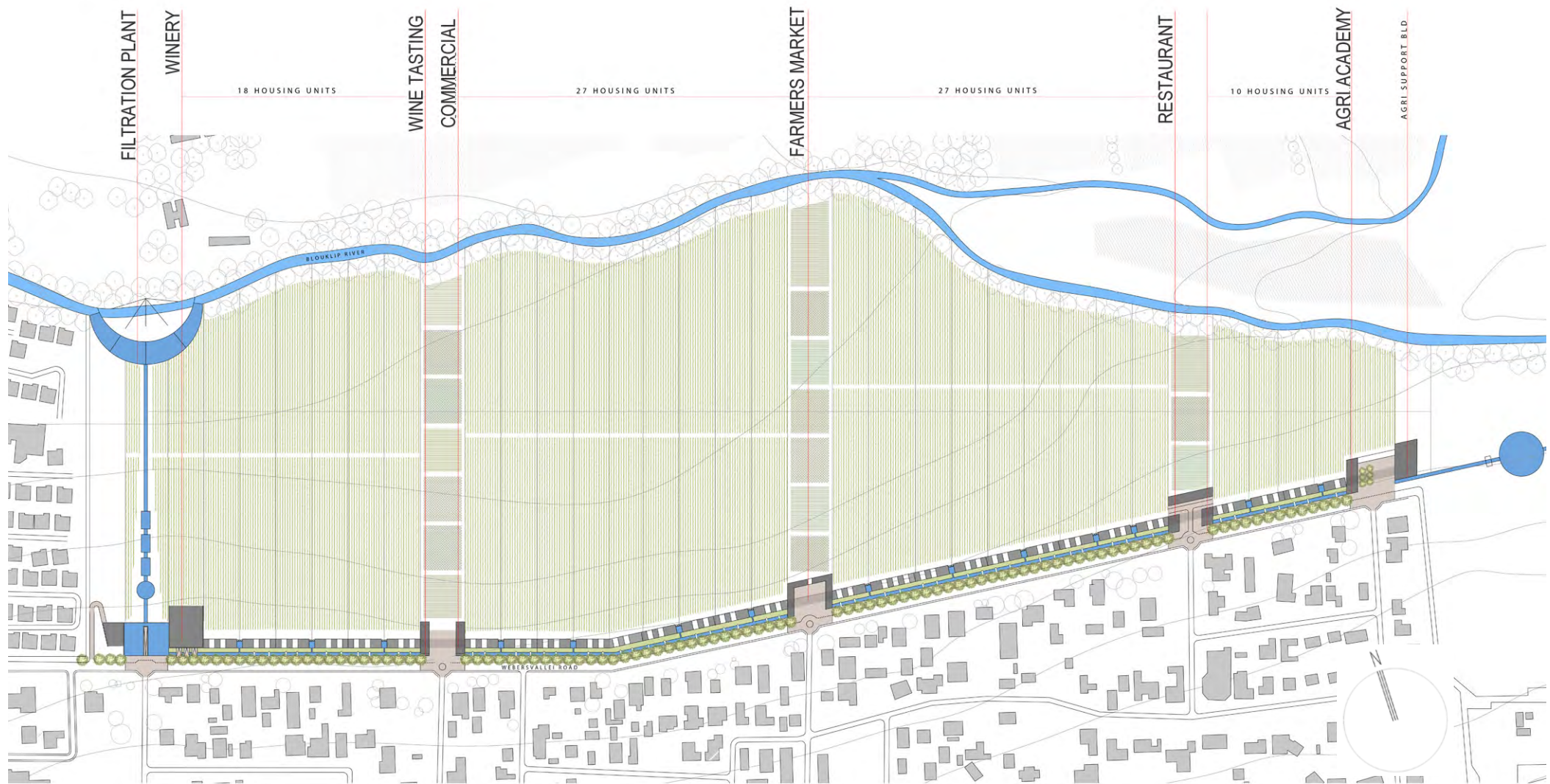


FIGURE 28 (ABOVE): Site plan of the urban sketch design. (Author)



FIGURE 29 (ABOVE): Context model of sketch design showing points of public interest connected by a wall of housing. (Author)



FIGURE 30 (ABOVE): Section through typical public node (Author)

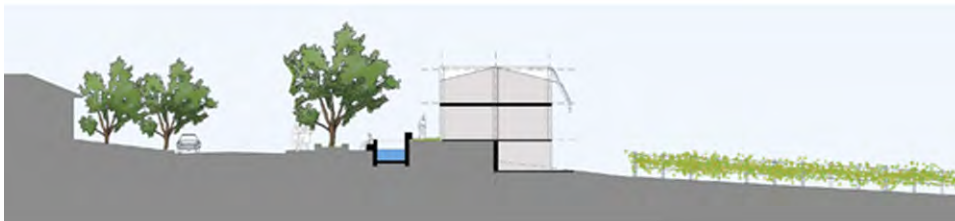


FIGURE 31 (ABOVE): Section through typical housing module (Author)

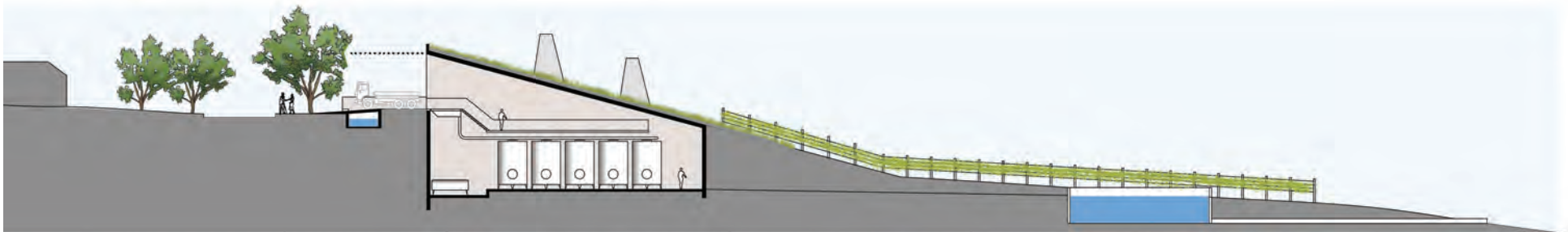


FIGURE 32 (ABOVE): Section through sketch design for the winery. (Author)

The initial sketch design followed some of the original urban intentions quite literally. The housing for example formed a wall - based on the idea of the traditional 'werf' wall - between the urban and the agricultural, densifying the character of the main street it was built against. However, the spatial distinction between the housing for the farmers and housing for members of the community was not clear enough and made it difficult to justify the concept of one wall of houses.

In section it became clear that this response was not necessarily the best approach, as the connection between the existing agriculture and the town was lost by placing buildings all the way along the edge at road level. The lower areas of the farm and parts of the view to the mountains from the houses across the road was thus lost as a result of the new buildings being double storey on road level.

This scheme also made use of the existing main road (Webersvallei Road) as the farm road to serve the individual farms. This meant the visitor would still only experience the urban side, being blocked from the farm by the buildings. From a practical point of view this layout would not work as this is a rather busy road and obstructions by slow moving farm vehicles would intercept the flow of the village.

04 DESIGN DEVELOPMENT - URBAN

4. DESIGN DEVELOPMENT

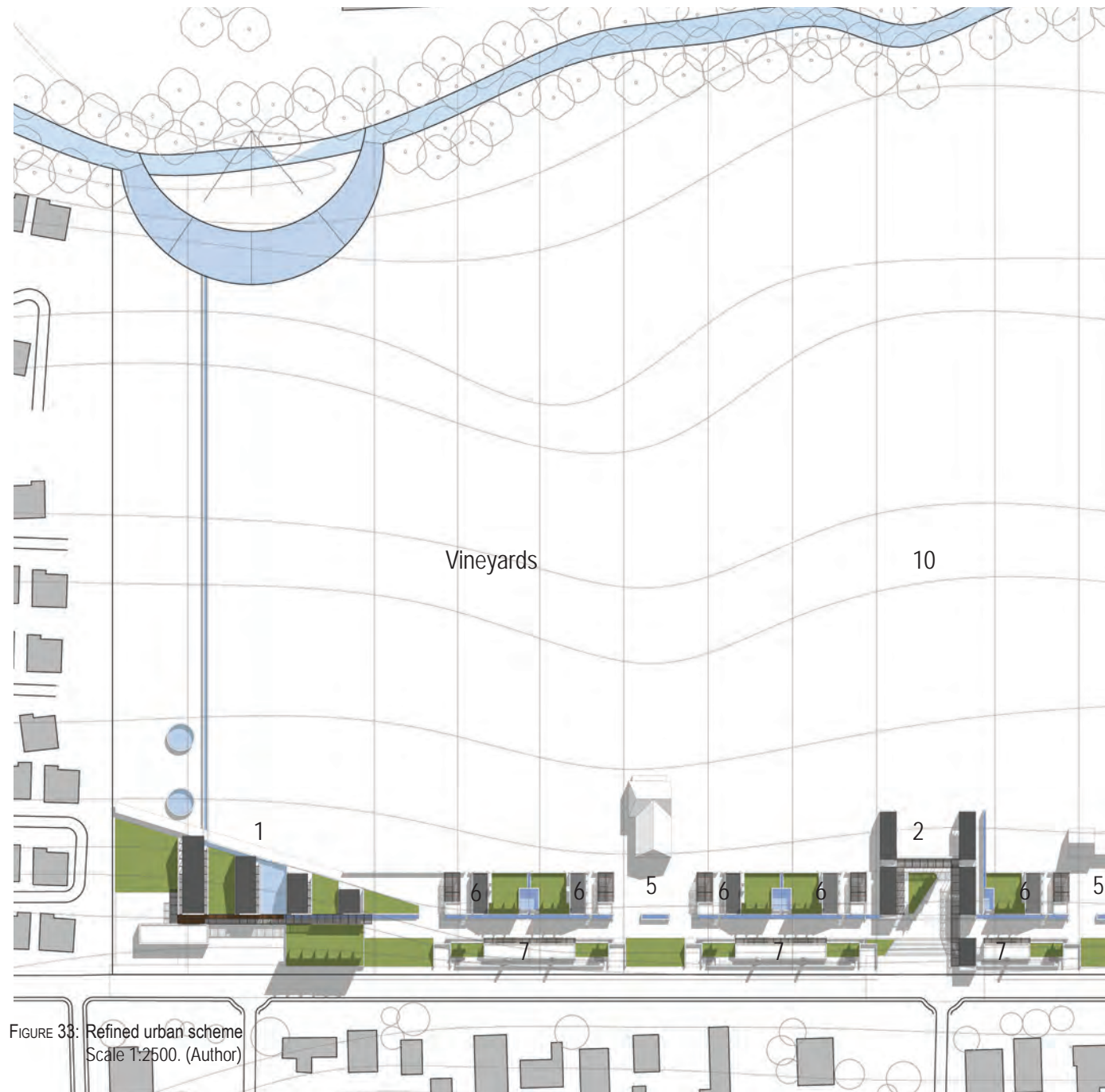
a. Refined Urban Scheme

The layout of the urban scheme is as follows:

- 1 Winery & tasting facilities
- 2 Farmers market & crèche
- 3 Restaurant, nursery and public transport stop
- 4 AgriAcademy and agricultural services (barn and admin)
- 5 Shared werf between 3 farms
- 6 Farmers house
- 7 Community housing
- 9 New pedestrian road/farm road
- 10 Community vegetable lots

A secondary route was introduced to run parallel to the existing road, creating opportunity to separate farmers' houses and community housing. This new spine will be pedestrian, linking the public facilities of the farm together in between the houses and the only vehicles using it are farm vehicles. This will give better integration between visitor and farm as the everyday processes of the farm will unfold along the same route the visitor takes.

Through scattering the public functions along the new route it creates better integration between the farm and urban as there is not one defined entrance to the scheme, but takes its layout cues from existing nodes of potential energy from the surroundings. For example the public functions are situated at existing busy intersections, creating economic opportunities between visitor, community and farm.





The existing houses on the site are better integrated with the new scheme, creating traditionally inspired 'werf' areas that are shared between every 3 plots/farms. These werf areas will be used as shared working space for the farms and will each feature a sorting and collection point for grapes. These happen at 7 different spots along the route. This function was incorporated into the scheme as the farmers from the small plot will not each have an individual tractor, but use the vehicles provided by the cooperative. By having separate collection points for the different farms' grapes to be taken to the winery, it creates more employment opportunities as grapes are hand sorted at each node and not by machines.

Much more emphasis is placed on responding to the existing contours on site. Through doing this, the level of the new pedestrian/farm road introduced into the scheme is placed 3m below the existing road, meaning that all the development happening along it will keep be placed more out of view from the main road. This keeps the dramatic views of the natural surroundings open from the existing road and the village, meaning that the connection between town and farm is not lost visually even though the spine along the road has been densified.

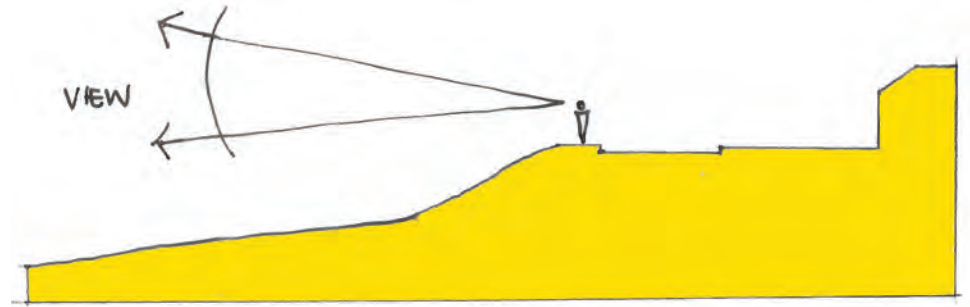


FIGURE 34 (ABOVE): The existing condition showing the relationship of the existing village houses to the street and the slope on site with views to mountains.

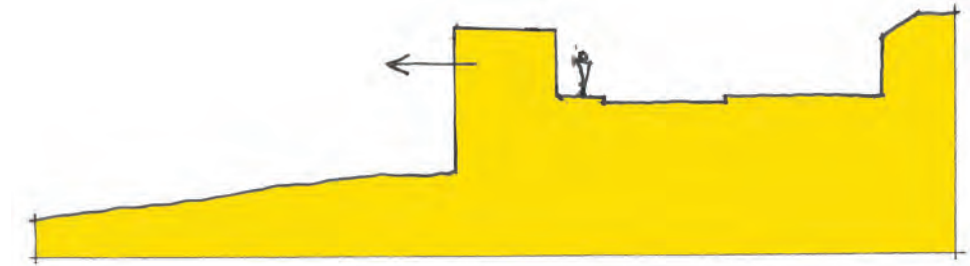


FIGURE 35 (ABOVE): Diagram of the initial response in sketch design to place new buildings on street level, blocking the view/connection to the landscape from the town. (Author)

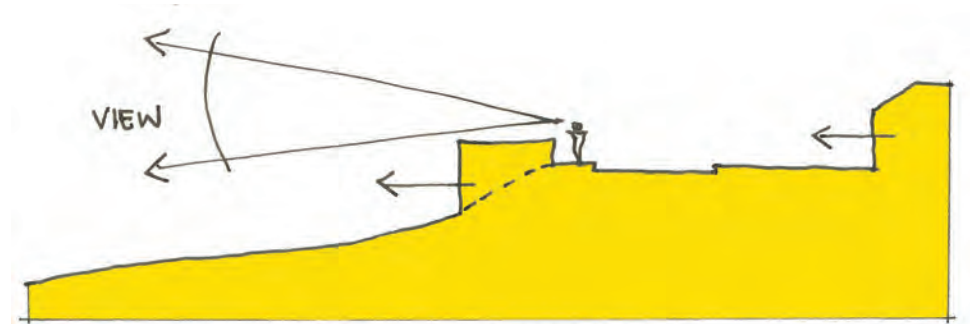


FIGURE 36 (ABOVE): Diagram showing the response to site by digging the new into the landscape and through that maintaining the connection between town and landscape. (Author)



FIGURE 37 (ABOVE): View of Stellenbosch Mountain from Webersvallei Road with site to the left and village on the right. (Author)



FIGURE 38 (ABOVE): Conceptual illustration of the new buildings placed lower than road level, keeping the view from town open towards the site and mountains (Author)

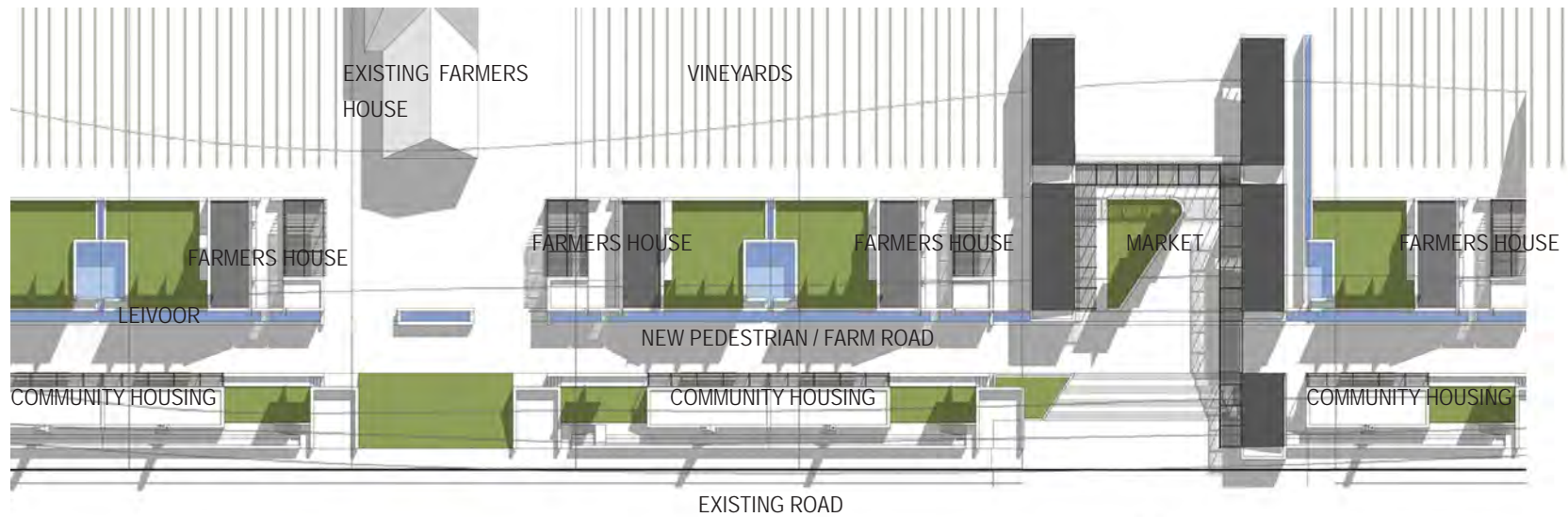
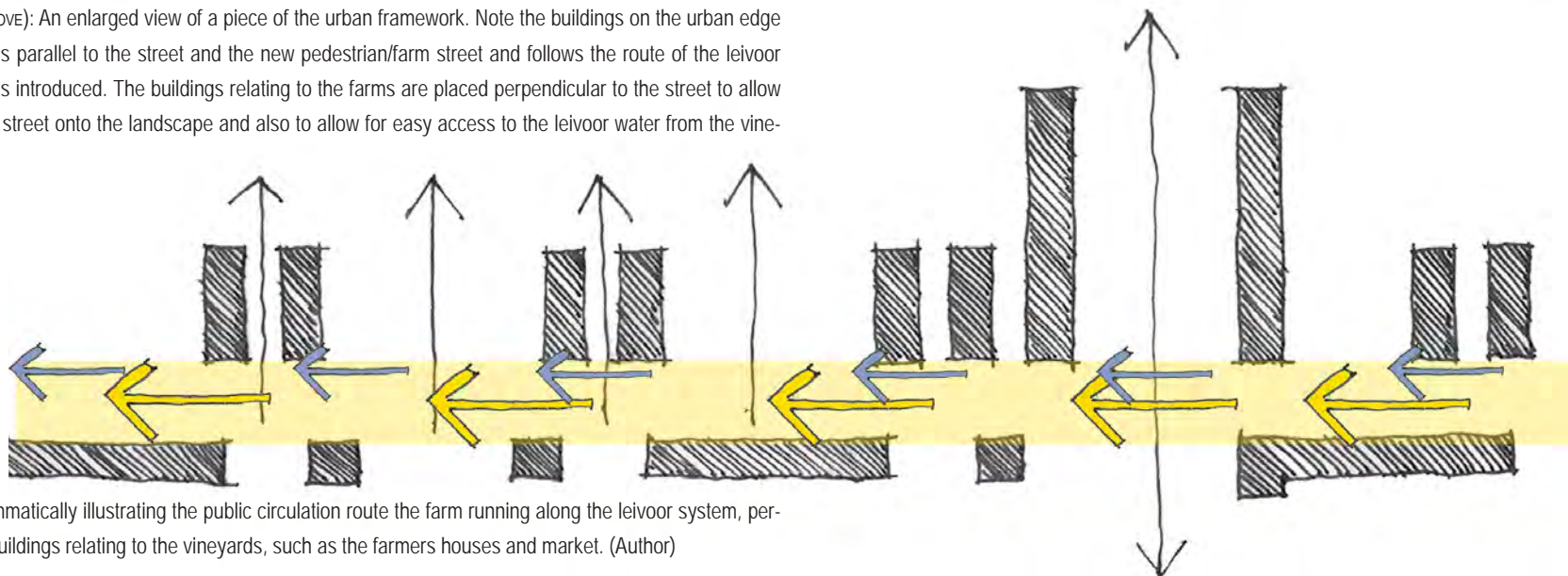


FIGURE 38A (ABOVE): An enlarged view of a piece of the urban framework. Note the buildings on the urban edge of the farm runs parallel to the street and the new pedestrian/farm street and follows the route of the leivoor system that was introduced. The buildings relating to the farms are placed perpendicular to the street to allow views from the street onto the landscape and also to allow for easy access to the leivoor water from the vineyards. (Author)



ABOVE: Diagrammatically illustrating the public circulation route the farm running along the leivoor system, perpendicular to buildings relating to the vineyards, such as the farmers houses and market. (Author)

05 DESIGN DEVELOPMENT - ARCHITECTURAL

a. Technical Study - Earth Construction

The winery will be developed in more detail to give expression to the architectural intentions of the project. The following section will look at earth construction in two phases; firstly the vernacular building technology of the Cape and the influence that had on modern earth construction and secondly on a contemporary approach to utilising earth in architecture through subterranean construction in the context of a winery.

Vernacular Construction Technology

A thorough understanding of vernacular technology of an area is important when investigating sustainable design. The fact that vernacular architecture is derived directly from what limited materials are available in the area makes it inherently sustainable.

At the Cape, the lack of stone and timber resulted in the vernacular being earth based in nature. Wattle and daub was used as the earliest method of construction, with cob and mud/adobe bricks being used later. By making use of earth/adobe construction, the walls of buildings ended up to very thick, resulting in very good thermal insulation keeping the interior of the building temperate throughout the year.

The susceptibility of earth construction to erosion from rain during the winter months necessitated the use of a protective coating to be applied to the earth/adobe walls. A lime based plastered was produced through burning seashells in kilns to extract the lime. This lime was mixed with mud to create a white plaster to cover the adobe walls and had to be replaced or re coated every year after the winter rains. The naturally white colour of the plaster reflected heat gain and aided in keeping buildings cool during the summer.

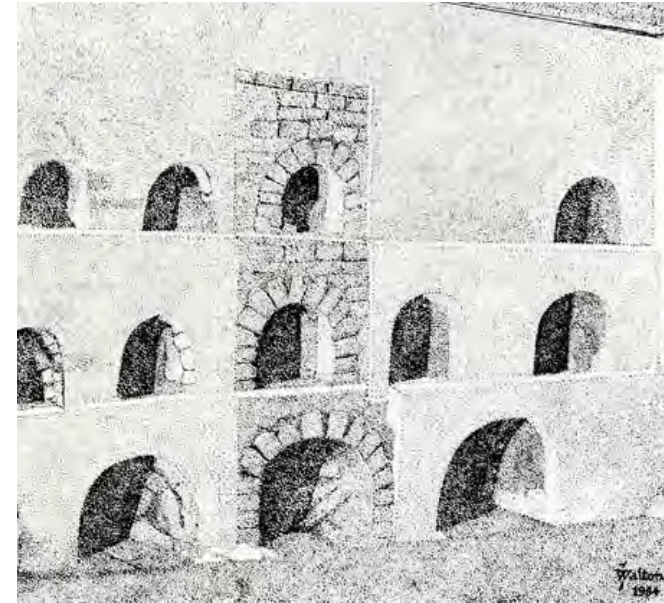


FIGURE 39 (ABOVE): Dovecotes with cut-away lime plaster to reveal adobe construction with bricks and arches. (VASSA/Walton 1984)

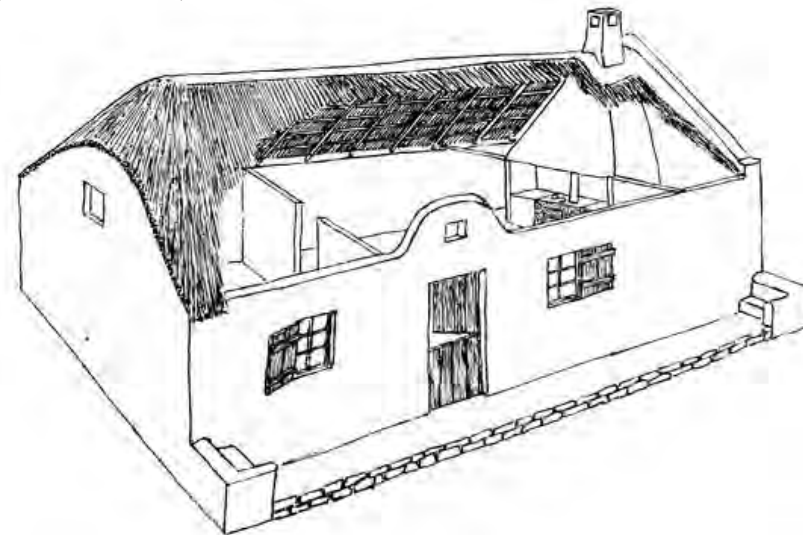


FIGURE 40 (ABOVE): Cut-away view of early vernacular dwelling construction with reed roof on timber beams. Note stone plinth to building. (VASSA)

The plan configuration of the typical Cape vernacular building was single room width with a depth of approximately 6m. This is due to the limited sizes of the indigenous trees, producing timber beams used for roofing with a maximum span of up to 7m. Roof covering is Thatch Reed, an indigenous shrub which is much more robust as roofing material than straw.

Ceilings formed an important part of the vernacular building for 2 reasons. It protected the thatch roof from fires inside the house, from where the traditional name of the ceiling comes from –brandzoler (fire ceiling) and also contributed to the thermal insulation of the building. These ceilings were constructed using beams with timber boards laid over it. These boards were then covered in puddled clay and layered with rough clay tiles.

The use of earth is thus a key element to the construction process of the vernacular and as was revealed in the theoretical section of this paper, it is not only through construction, but the link between terroir and the development of the vernacular to respond to site and landscape inherently links the vernacular to the ground. The relationship to how a building responds to the landscape through the utilisation of earth is thus paramount to the design of a vernacular inspired building.

The following section will investigate different ways of construction with earth to establish the best suited method of construction for the winery and housing units of this project.

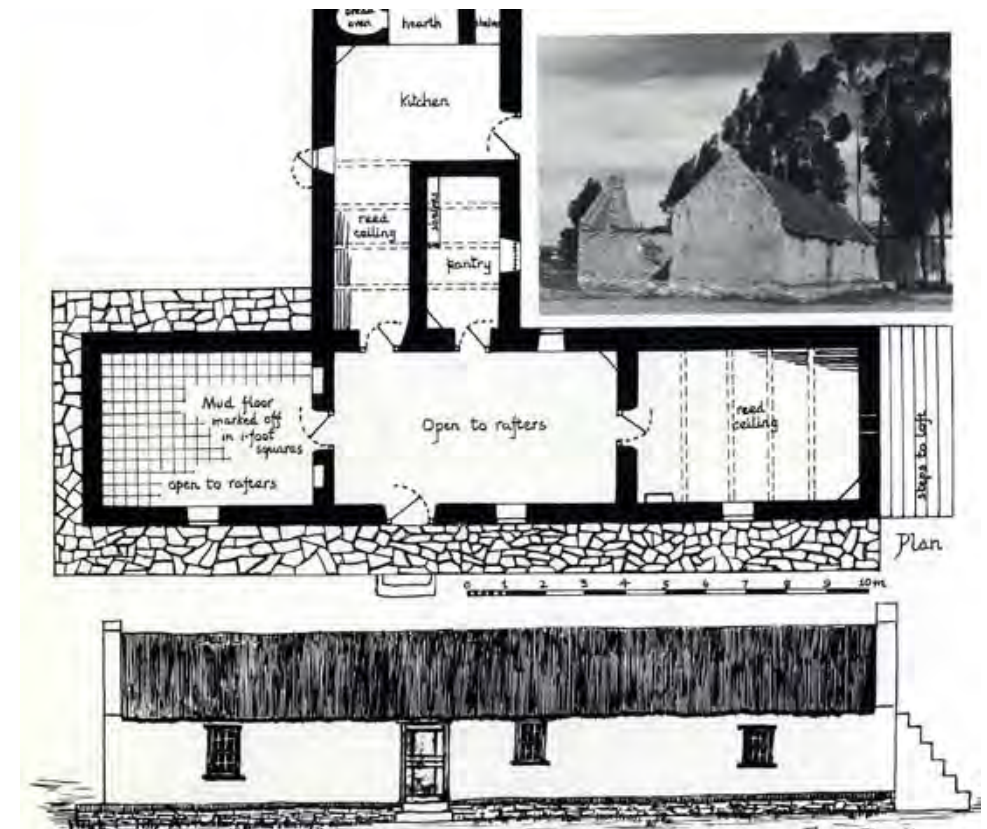


FIGURE 41 (ABOVE): Note one room deep floor plan of the traditional Cape vernacular building. (VASSA)



FIGURE 42 (LEFT): Use of natural materials in vernacular construction: adobe walls with rough lime plaster and timber lintels over timber screened openings. (VASSA)

Adobe Construction

It is vital to understand the composition of the soil on site that is planned to be used for earth construction. Soil is composed of 4 elements: gravel, sand, silt and clay. The most important aspect of the soil to be investigated is the amount of clay in the soil. Clay acts as the binding element, yet can cause weakness in the construction if it forms too large a proportion of the overall mix. Clay expands when it is exposed to moisture and shrinks when it dries, causing cracks in the construction. Keeping earth walls free of moisture exposure is thus very important.

Adobe wall construction is the use of mud bricks and is the most commonly used earth-based construction method used. To form the bricks mud, straw and water are mixed and shaped bricks in timber moulds and left in the sun to dry. The bricks are then stacked with mud mortar in between to form a wall.

The walls are finished with a mud plaster mixed with lime to make it waterproof, but in wet climates the plaster needs to be reapplied yearly.

Rammed Earth Construction

Rammed earth construction, also known by its French name as *Pisé de Terre*, necessitates more tools, skills and earth to achieve than adobe construction, but due to its compacted nature it is much stronger in compression and has greater moisture resistance. Earth is poured in between shuttering board in layers and compacted by tamping device or pneumatic tamper. The ideal soil mixture for rammed earth is 20% clay, 20% coarse aggregate, 30% sand and 30% silt. Excess clay content can be remedied by adding sand to the mixture.

Rammed earth walls are hygroscopic in nature, meaning it absorbs and releases water vapour to regulate humidity levels of its surroundings; however, rammed earth walls are still susceptible to erosion from water if it is unstabilised or unfinished. Portland cement can be added as a stabiliser, but due to its crystalline properties makes the rammed earth wall lose its inherent humidity benefits as it seals the wall completely. Hydrated lime is the superior stabiliser as it is also hygroscopic in nature, allowing the movement of water vapour through the wall, but stopping water droplets from entering. It can either be added to the soil mixture or applied as a finish to external face of the wall.

For the purposes of the design of the winery, rammed earth will be used as the primary material. This ties together conceptually the idea of vernacular construction, the connection of vernacular to the physical landscape and the relationship between viticulture and the earth (*terroir*). Rammed earth was selected over adobe walls due to superior strength for large construction and better resistance to moisture damage.

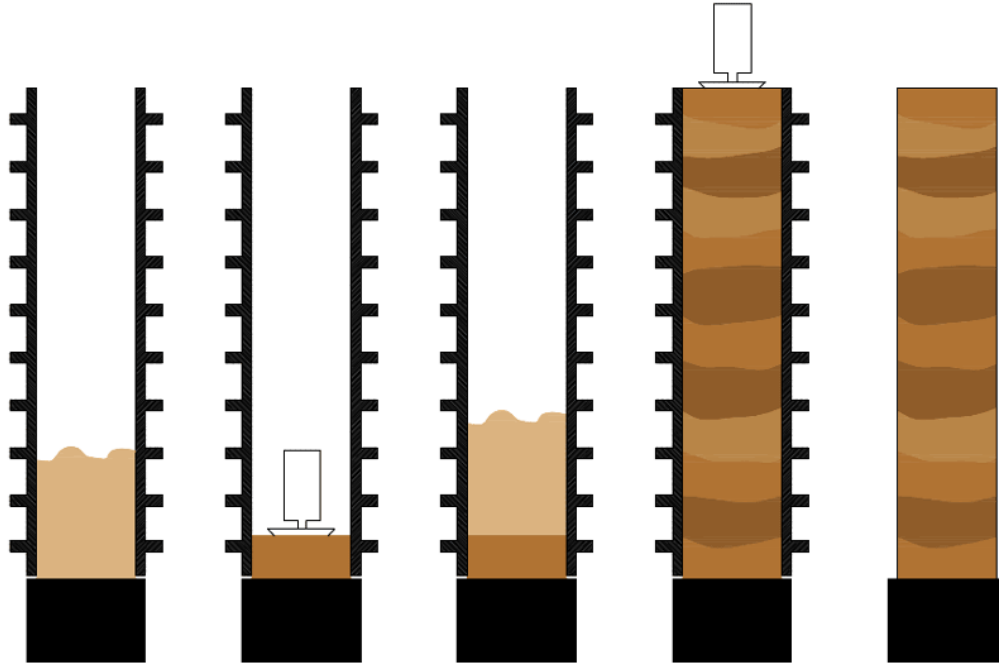
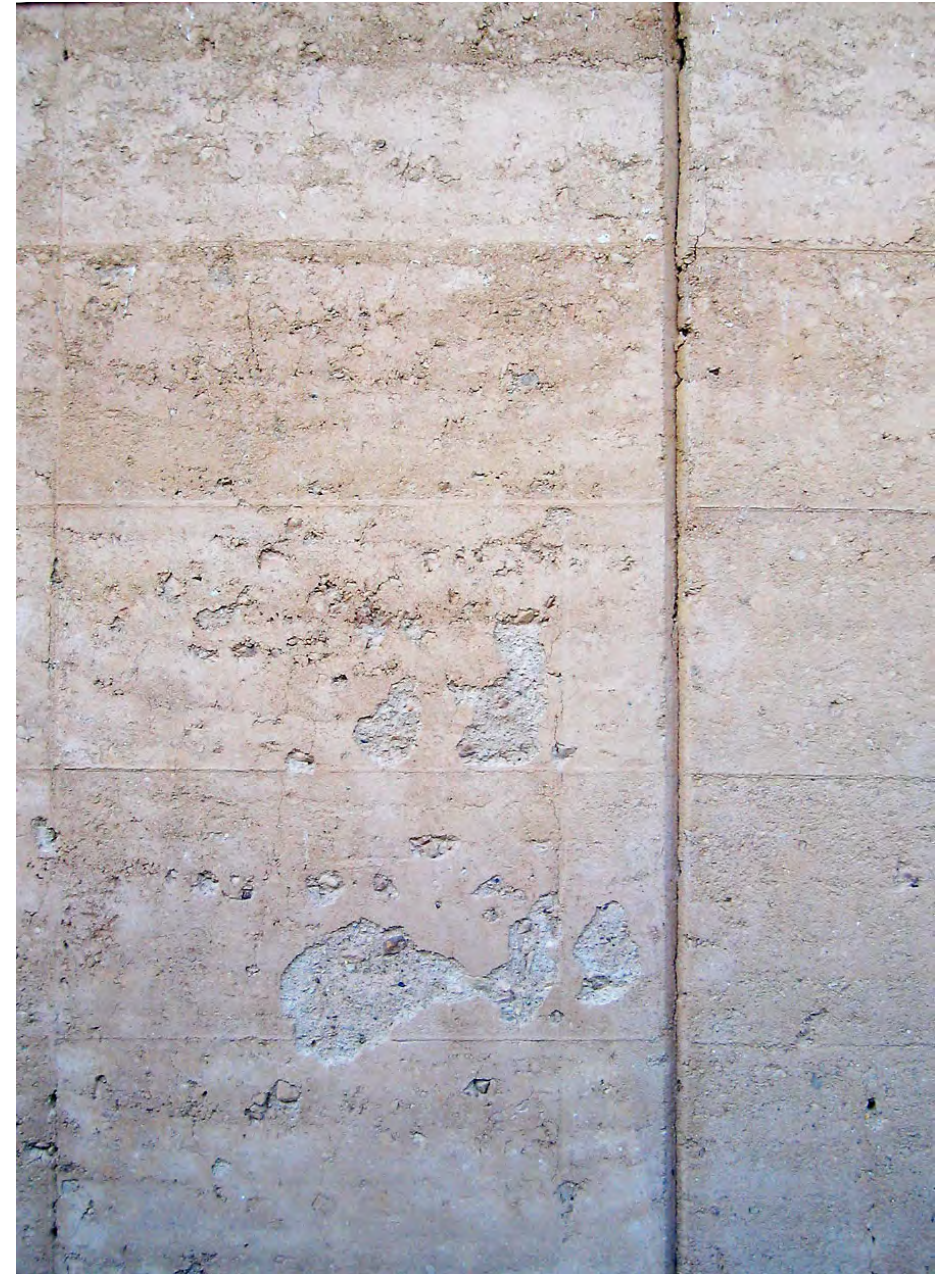


FIGURE 43 (ABOVE): The construction process of a rammed earth wall. First a concrete strip footing foundation is cast onto which the first layer of moist soil and cement mixture is placed and compacted in formwork similar to that of concrete. As the layer is done, the next layer of moist soil is cast on top and compacted. Compacting can be done manually, but a pneumatic compactor creates a wall with a stronger between layers. (www.smartplanet.com. Edited)

FIGURE 44 (RIGHT): A close up view of the texture of a rammed earth wall with cement as stabilising additive. (studiocuranzio.blogspot.com/2010/04)



Subterranean Construction: The benefits of building under the earth in the context of a winery

The natural thermal insulation properties of earth is something that can greatly benefit wineries. Parts of a winery such as the ageing cellar has very specific climatic needs in order for the wine to age at its optimum. In a lot of contemporary winery designs, mechanical cooling is used to achieve these desired climatic conditions and through that contributes to a non sustainable way of operating a winery and contributing to the climate change that is threatening the very terroir of the viticultural region.

The winery should be designed in a way to minimise its effect on climate change and be able to deal with the current ambient requirements for a winery, without having to constantly come up with strategies for anticipatory adaption to suit the ever evolving threat of climate change.

Too often one sees contemporary wineries designed to showcase the estate to the visitor and making use of an architecture which is not able to fulfil the many spatial and climatic requirements of the processes involved in a winery.

These types of wineries are usually built on the landscape and not integrated with in order for it to respond to the needs of the winery. The resulting building tends to end up as an above ground structure in a horizontal configuration, going against the natural flow of the process, i.e. the flow of the wine itself. This horizontal layout means that during the processing of grapes into wine, the product needs to be pumped with electronic pumps from one phase to the next. This does not only use unnecessarily large amounts of electricity, but also reduces the quality of the final product.

The next and one of the most important challenges faced by above ground wineries is that of creating the ultimate ambient temperature and humidity levels in the cellar for the fermentation and aging processes to ensure the best quality wine. It is very important that the year round inside temperature of the winery stays between 8°C and 15°C and the humidity above 60%, depending on the variety of grape.

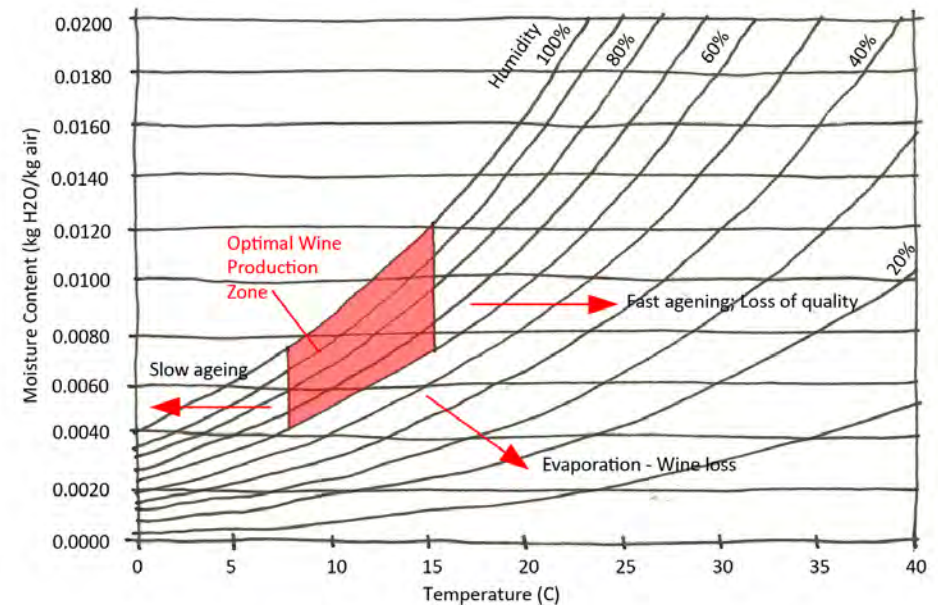


FIGURE 45 (ABOVE): Optimal climatic conditions for wine production. (Mazaron)

Since most of the building materials used in above ground wineries do not have the sufficient insulation characteristics to ensure constant levels of temperature and humidity throughout the year, these facilities have to resort to using artificial heating and cooling systems, amounting large expenses for the establishment and forcing it to rely on energy resources.

This inquiry into the ultimate ambient conditions for the winery to operate in, thus led to an exploration of how, before the modern inventions of mechanical pumps and ventilation systems, historical wineries created the perfect environments. Wine was traditionally stored and aged in subterranean cellars, often referred to as wine caves, where the thermal inertia of the soil produces thermal stability, creating a constant temperature and humidity level where wine can age at its optimum. Fluctuating temperature levels does not only affect the way in which the wine ages, but also has a dramatic effect on the amount of wine lost due to evaporation during ageing.

A study done by Fernando Mazarron in the Ribera del Duero wine region in Spain compares the suitability of 5 different types of construction for wine production and ageing. The data from this study is very relevant to wine production at the Cape, specifically Stellenbosch, as the Ribera del Duero region has a similar Mediterranean climate as Stellenbosch with an average summer high temperature of 35°C and an average winter temperature of 5°C. The five different construction types analysed are the following:



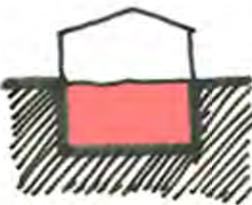


	<p>Aboveground without air-conditioning:</p> <p>The structure has concrete block walls and a flat concrete roof, making use of natural ventilation only.</p>
	<p>Aboveground with air-conditioning:</p> <p>The structure has concrete block walls and a flat concrete roof. Artificially controlled by air-conditioning.</p>
	<p>Basement:</p> <p>Built underneath a masonry structure with a steel roof. The walls of the basement are concrete and are entirely in contact with earth on the exterior face. No artificial cooling.</p>
	<p>Covered in earth:</p> <p>Concrete dome structure covered in excavated soil from the site. No artificial cooling.</p>
	<p>Underground:</p> <p>Bare earth walls (excavated), covered by approximately 1m of earth on top and on all the sides. No artificial cooling.</p>

FIGURE 46 (ABOVE): Study of different subterranean building forms for study by Fernando Mazarron. (Author)

Using temperature and humidity data collected at the five different types of buildings over a 3 year period (2006 – 2009), a summative graph was produced showing how the different building types performed in relation to the optimal environment for wine production and ageing.

From this psychrometric chart on the right can be clearly deduced that the subterranean winery (in brown) has the smallest variation in atmospheric conditions and this stable environment will result in a better quality wine and large savings in operational cost of the facility. Thermal mass is thus a key element to the design of a winery, and looking back at the typical Cape vernacular wine estates in the Stellenbosch region, one can also see that this concept also played a role in the design of the winery. Even though wine estates at the Cape in the late 17th and 18th century did not make use of the above mentioned wine caves, incorporating thermal mass in the building was an inherent part of the local vernacular at that time. The walls were adobe construction, using the earth and its insulation qualities to create ambient interior spaces to reflect the desired levels of temperature and humidity of the wine cellar. Since the building materials were of a poor quality, walls were often up to 800mm thick in order to support the roof. The wine cellars did not feature the same large windows as the residential buildings of the same era, as it would weaken the insulating qualities of adobe construction, yet was a necessity to have windows to ventilate the space and get rid of carbon dioxide produced in large quantities during wine ageing.

Taking the modern winery into the ground is thus a return to the vernacular, not through imitation of the adobe construction, but through utilising the principles thereof and recognising the insulating capabilities of earth in its unaltered form.

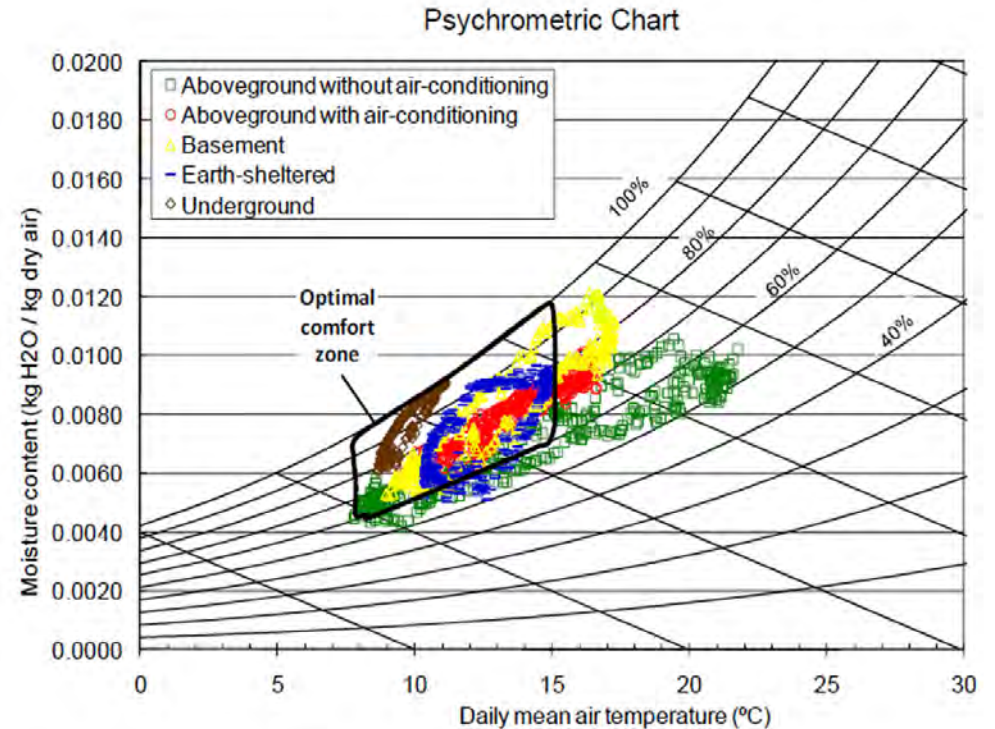


FIGURE 47 (ABOVE): Psychrometric chart showing the best performing structure for a winery is a entirely underground building as it has the smallest fluctuation in daily humidity and temperature levels. (Mazaron)

b. Programme - Winery

The next part of the document will investigate the functional aspects required for a winery and will then move onto the planning and design of the winery within the context of the urban scheme.

Since this project is focussed on blurring the line between the farm and community / production and the user, the project will not just consist of a normal commercial processing winery, but will also include a micro-winery.

A micro-winery is a facility where members of public can produce their own wine in smaller quantities. The reason for doing this in the winery is that the wine making process makes use of very expensive and specialised equipment and this affords the opportunity to members of the public to also have access to these types of facilities.

The main driving idea behind including a micro-winery is to add another level of interaction between the farm worker/owner and the visitor/customer. The customer can now buy a specific farmers' produce, participate in the growing/harvesting of the grapes in association with the farmer and then see the grapes through the entire process of production of making wine.

c. Design Considerations:

Gravitational Winery Design

The gravitational layout of a winery can help substantially in the running of the facility. By using this principle, mechanical pumps that are used to move the grapes and wine between different stages in the production become obsolete. Not only does this save money and reduce the wineries reliance on energy sources, but is also improves the quality of the final wine as the grapes are handled with more care if transported through gravity alone.

Instead of having a more traditional horizontal layout and flow to the winery, the different stages along the process can be stacked vertically to utilise the power of gravity. At the highest point in the winery, grapes are put into a destemmer, where the stems are taken of and the grapes are then crushed. The juice from the crushed grapes and the grapes then flow into tubes in the bottom of the destemmer that are connected to fermentation tanks on a lower level. Once the grapes are in the fermentation tank, yeast is added (or the grapes are left with its natural yeast) to turn the grape juice into alcohol. Wine is then pressed, where the wine is separated from the skins of the grape and flows into settling tanks, another level down, from where the wine is run into smaller barrels for aging and storing. From these barrels, the wine is pushed with nitrogen back into the settling tanks from where it flows through a different channel to the bottling plant. In practice however it very seldomly happens that a site with a large steep enough slope is available to accommodate level changes after each stage. If that is the case, then one should locate the winery on site in such a way that the most crucial phases of the process can occur with gravity. Those phases are the loading of the crushed grapes into the fermentation tanks and then from the fermentation tanks into the press/mixing tanks. The optimum level change for these two phases is 4.2m as the fermentation tanks are normally 3m high and the pressers are 1.2m high.

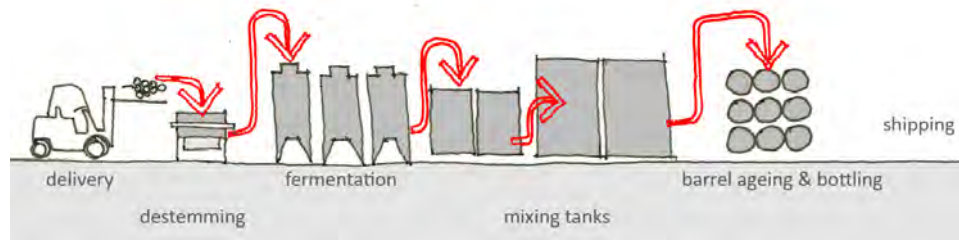


FIGURE 48 (ABOVE): Diagram illustrating the process of a winery with a horizontal spatial configuration. (Author)

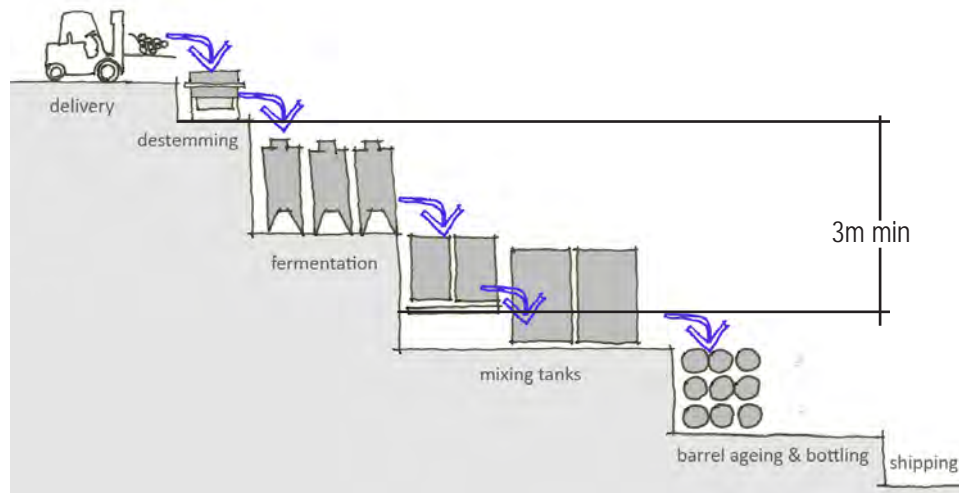


FIGURE 49 (ABOVE): Diagram illustrating the process of a winery with a gravitational spatial configuration on multiple levels.

Before design can begin one has to establish the amount of equipment that will be needed in the winery to process the amount of grapes produced by the cooperative. In order to do this, one must establish the amount of grapes produced as that will indicate the number of fermentation tanks required and oak barrels for ageing, which will both determine the sizing of the winery.

Calculations:

Total size of site:	30 hectare (ha)
Area allocated to development and existing houses:	3ha
Area allocated to other crops for community gardens:	3.64ha
Area allocated to vineyards:	<u>23.36ha</u>

At the normal vine density for Stellenbosch at 3300 vines per hectare, it produce 49 hecto-litres (hL) of wine per hectare.

Thus the 23.36ha of available land will produce 1127hL (112 700L) wine.

The equipment needed:

Grape crusher with conveyor belt	1
Fermentation tanks:	10
100hL	10
50hL	2
13hL	2
Press	1
Oak Barrels	375

Other key design considerations:




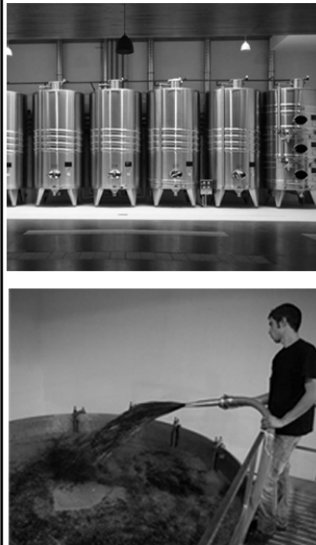
- Temperature

Fermentation, maturation and bottle storage all have different temperature requirements with maturation being the one that needs to most constant temperature and should preferably be placed in the basement or with earth filling against the walls.

- Ventilation:

Ventilation is very important in the fermentation area as large quantities of carbon dioxide it released during the fermentation process. Natural ventilation is preferred as it reduced operation cost of the winery.

This table describes the process of wine making and the architectural requirements of each phase

PHASE OF PRODUCTION	EQUIPMENT / PROCESS	ARCHITECTURAL REQ	PHASE OF PRODUCTION	EQUIPMENT / PROCESS	ARCHITECTURAL REQ
<p>1 Harvesting</p> <p>Harvesting is preferably done by hand to ensure quality and to minimise damage to the grapes. Mechanised harvesting also requires more space (in excess of 3m between rows) and is thus not suitable for small or starter farms as it reduces the yield and thus profit.</p>		<p>FIGURE 50: Grape pickers (wine-spectator.com)</p>	<p>3 Destemming</p> <p>The grapes are thrown into a mechanical destemmer, separating the grapes from the stems.</p> <p>From the destemmer, a conveyor belt transports the grapes to a holding tank from where it is pumped into fermentation tanks.</p>		<p>Must be easily accessible to tractor with trailer, preferably located on a lower level for ease of unloading of the grapes. First step in implementing gravitational design.</p> <p>FIGURE 53 & 54: Destemming machine (wineanorak.com)</p>
<p>2 Sorting</p> <p>Grapes still on the stem are hand sorted to filter out rotten or raisined grapes to ensure only good quality grapes going into the fermenters</p>		<p>Generally happens before the grapes enter the main cellar, thus requiring a outdoor/ covered outdoor space.</p> <p>FIGURE 51 & 52: hand sorting grapes (Author)</p>	<p>4 Fermentation</p> <p>During fermentation, grapes are mixed with yeast to form an alcoholic product. There are three types of fermentation processes:</p> <ul style="list-style-type: none"> - Traditional: open concrete troughs are filled with grapes and constantly mixed/crushed through manual labour. - Mechanised traditional: similar principle as above, except it is a s/steel tank and mechanical mixer. - Most common: S/Steel tanks with oxygen filtration to aid yeast growth 		<p>The volume of the space must be large enough to accommodate the large stainless steel tanks and facilitate operation of the tanks from the top (usually with elevated service walkway) and the bottom. Located on a level at least 5m below the destemmer and crusher to encourage gravitational flow. The chamber must be well ventilated (pref. passive) due to large quantities of carbon dioxide produced during fermentation.</p> <p>FIGURE 55 & 56: Fermentation tanks and filling the tanks from the gantry walkway. (corkbuzz.com)</p>





PHASE OF PRODUCTION	EQUIPMENT / PROCESS	ARCHITECTURAL REQ	PHASE OF PRODUCTION	EQUIPMENT / PROCESS	ARCHITECTURAL REQ
<p>5 Pressing & Barrelling</p> <p>From the fermenters, the product is filtered to remove impurities and are pumped into wooden maturation barrels.</p> <p>The filtering happens during pressing, where the skins of the grapes are pressed to utilise all the wine. Left over skins are turned into compost to work into the vineyards.</p> <p>Depending on the desired taste (wooden or fruity) the product is either placed in new 225L barrels or in larger, reused timber barrels, normally oak.</p>		<p>Generally located on a level slightly lower than the fermentation tanks to facilitate gravitational flow, the pressers do not require large areas. Placing wine in barrels does not need to happen on a lower level, depending on the size of barrel used.</p>	<p>7 Ageing/Maturation</p> <p>The wooden barrels are placed in a climatically stable chamber for consistent ageing. The temperature should remain stable between 14-18c and at 60% humidity.</p> <p>Lighter wines are matured in stainless steel barrels to avoid the timber taste.</p>		<p>Subterranean chambers creates the best climatic conditions to age wine in as the thermal inertia of the earth surrounding the room keeps the temperature and humidity levels constant. Easy access with forklift encouraged to aid in moving barrels.</p>
<p>6 Cleaning fermentation tanks</p> <p>The yeast build-up in stainless steel tanks during fermentation requires large amounts of water to clean before the tank can be used again. The water is contaminated after cleaning and cannot be returned to natural systems without filtration</p>		<p>Incorporating a filtration system in the design of the winery can help alleviate the strain of the winery on the local water sources and can return used water to natural systems in the area.</p>	<p>8 Bottling</p> <p>Wine is removed from the vats with nitrogen under pressure in a closed system to minimise the exposure to oxygen. An automated machine bottles and labels the wine.</p> <p>Packaging and stacking onto pallets occurs after bottling before it is shipped/stored.</p>		<p>Fully mechanised industrial system. Area required for the handling of barrels prior to bottling. Ease of access to bottle store or shipping area.</p>

FIGURE 57: Wine press (Author)

FIGURE 59: Wine ageing barrels (Fraser, H)

FIGURE 58: Servicing & cleaning fermentation tanks (tma1992.ru/images/tanks)

FIGURE 60: Wine bottling plant (www.acea.net.au)

d. Spatial configuration of the winery

Following from the concept of the entire cooperative of integrating tourist and process, the same principle will be used in the planning of the winery, intersecting the route of the grape, the worker and the visitor to a practical extent along the process of the winery.

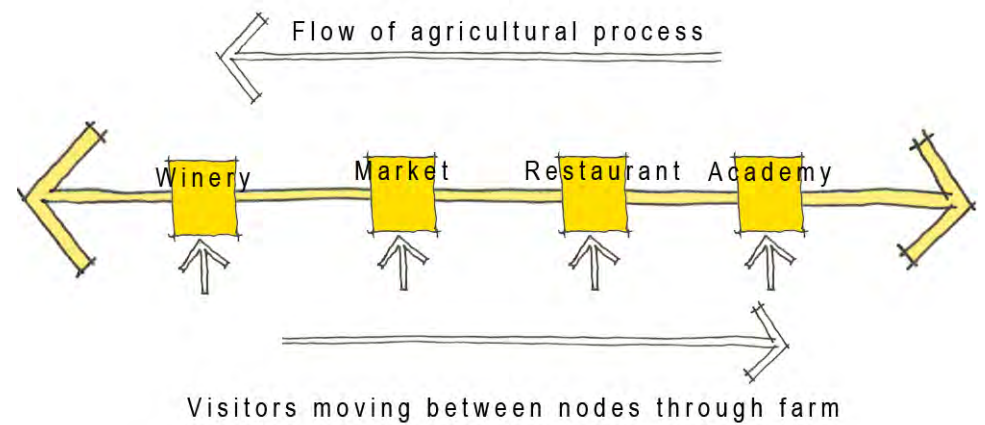


FIGURE 61 (ABOVE): Diagrammatic illustration of the spatial organisation of the wine cooperative on an urban scale. The process (farm activity) and visitor movement happens along the same axis and thus encourages interaction between the two.

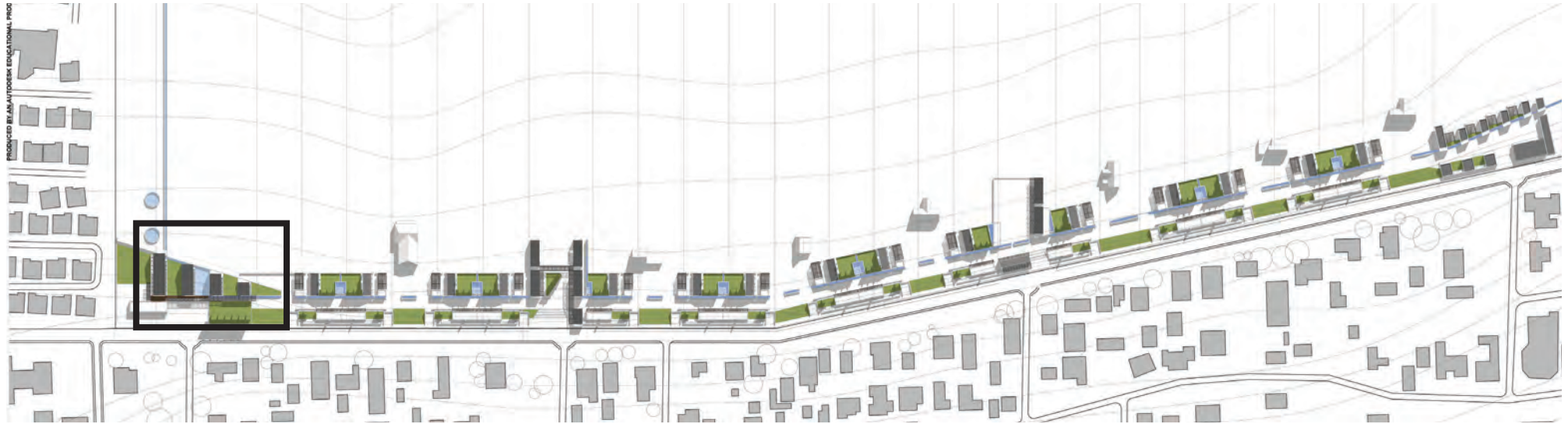


FIGURE 62 (ABOVE): The location of the winery in the urban scheme (Author).

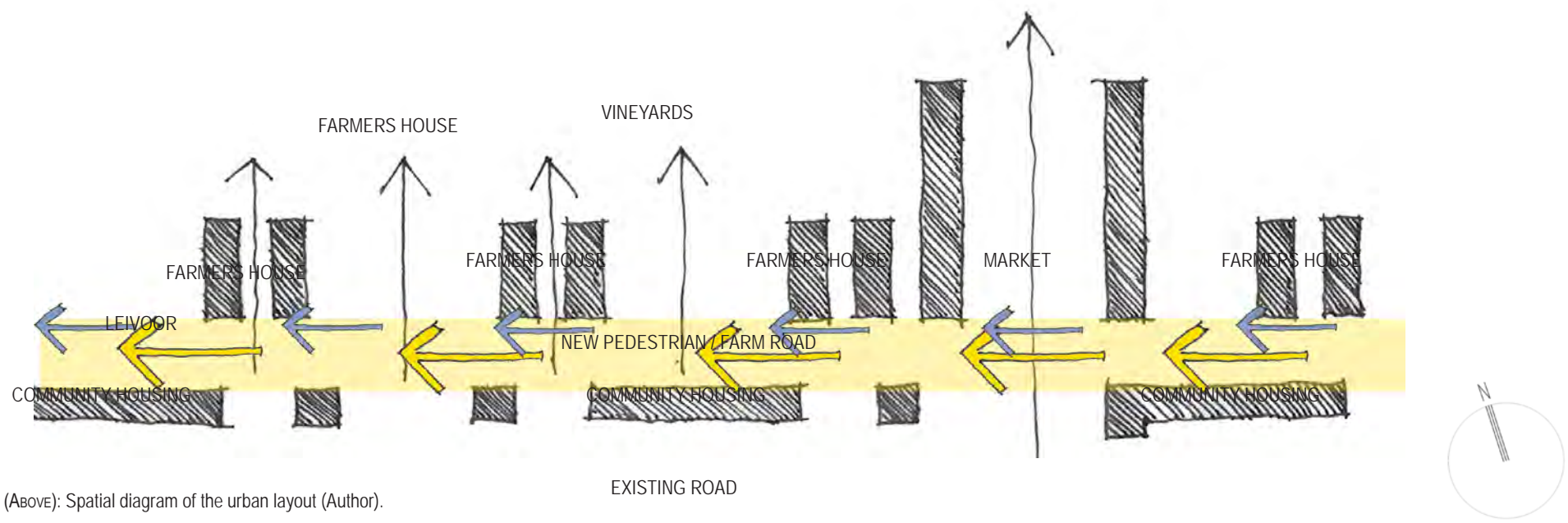


FIGURE 63 (ABOVE): Spatial diagram of the urban layout (Author).

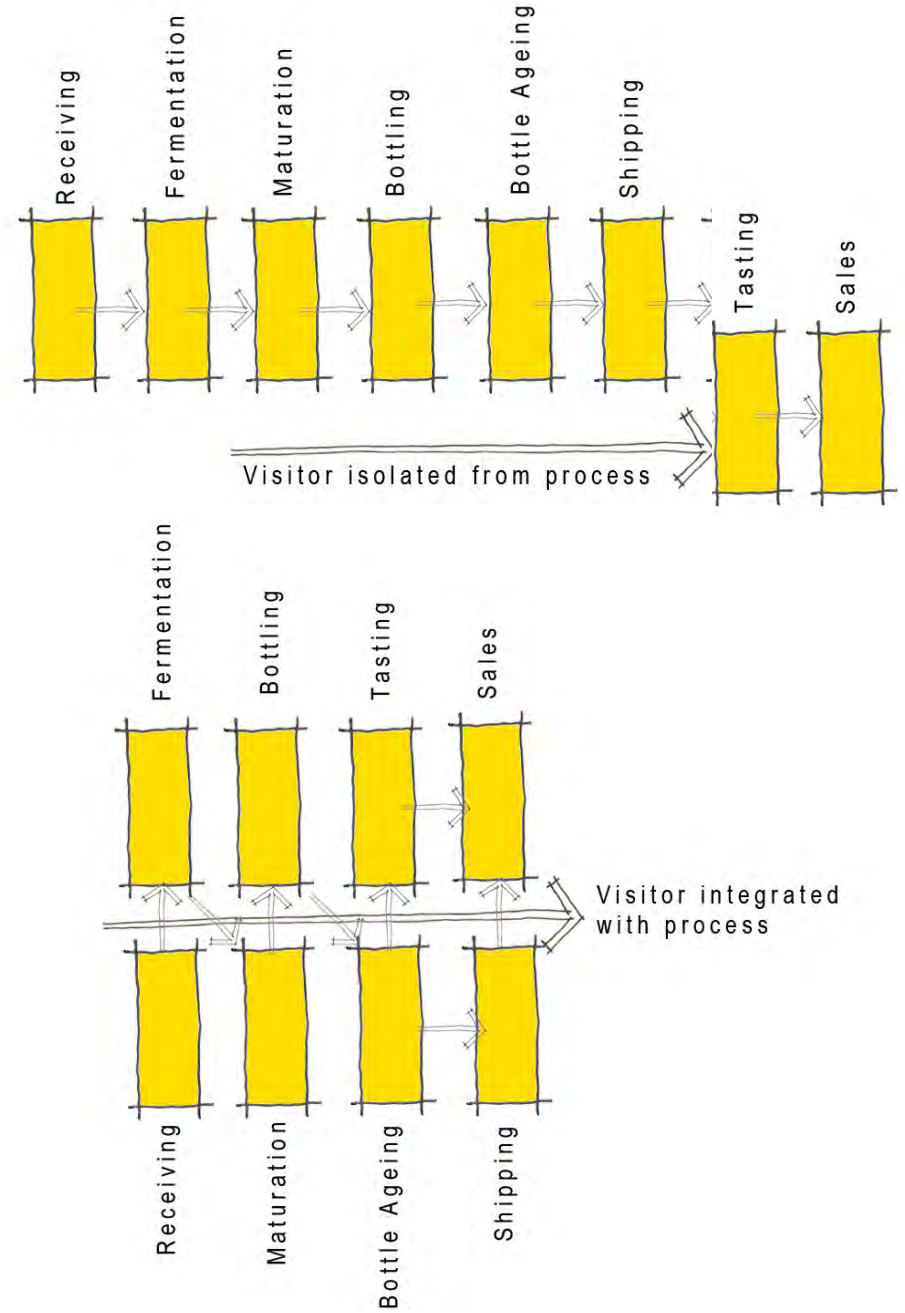


FIGURE 64 (TOP RIGHT): The more conventional spatial structure of a commercial winery, tourist and product has separate routes.

Figure 65 (Right) Route of the product and visitor intertwined to give the visitor a better understanding of the process of wine making as the route progresses.

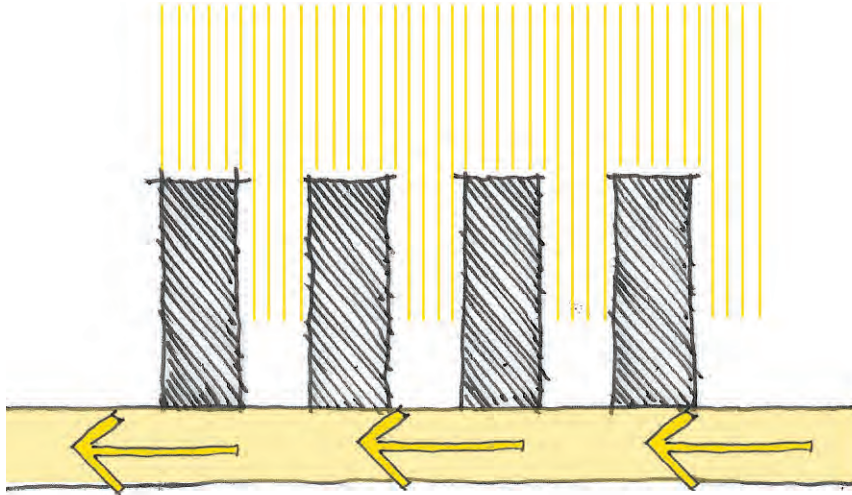


FIGURE 66 (ABOVE): The winery was designed following a similar spatial approach as the urban scheme. The functions of the winery relating to process and grapes runs perpendicular to the public route. The spatial grid of the winery is based on the 2.5m grid of the vines in the vineyard in which the winery is built.

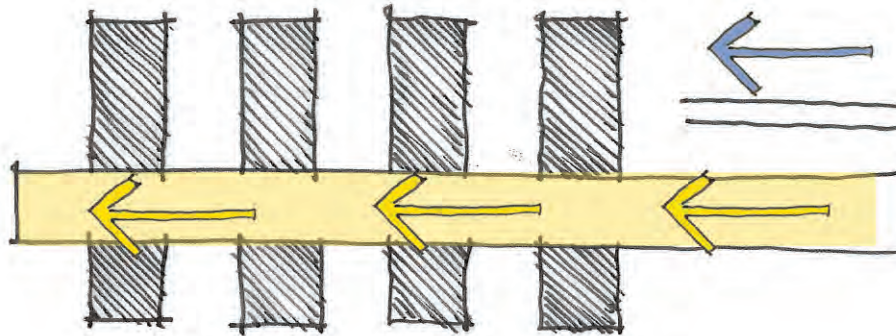


FIGURE 68 (ABOVE): The pedestrian route on the farm follows the 'leivoor' system that was introduced into the scheme. Since the pedestrian route now leads into the winery building, the leivoor needs to separate from the public route.

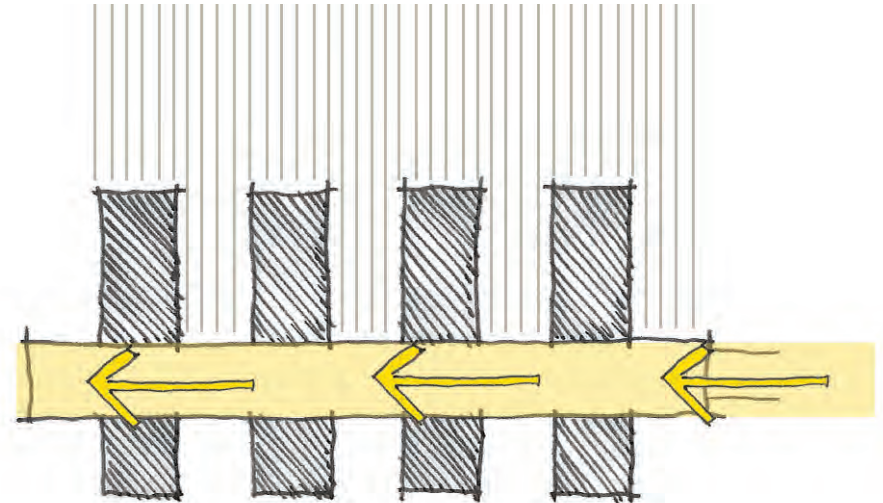


FIGURE 67 (ABOVE): The public route intersects the different phases of the winery to give the visitors a better understanding of the wine making process as they move through the facility. By splitting the functions of the winery into different buildings perpendicular to the movement of the visitor, the visitor will simultaneously have interaction with both the landscape and the process.

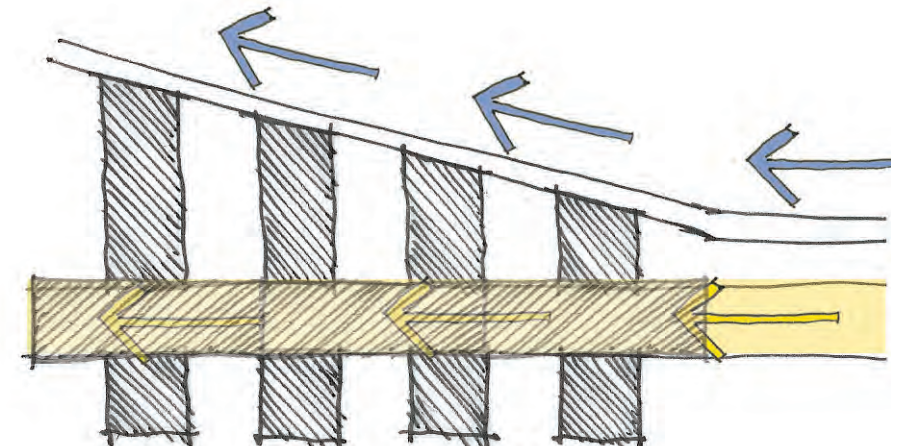


FIGURE 69 (ABOVE): The leivoor follows the natural line of the contour it runs on from the other side of the scheme, providing the opportunity to vary the shape and size of the individual buildings for the winery. The winery in essence becomes a glass box enveloped around the public route (central yellow space) intersected by more solid rammed earth structures housing the winery functions.



- 1 Arrival
- 2 Public entrance lobby
- 3 Reception
- 4 Public walkway
- 5 Open below
- 6 Admin/micro winery circulation
- 7 Micro winery administration
- 8 Outside meeting courtyard
- 9 Administration offices
- 10 Micro winery bottle ageing
- 11 Elevator
- 12 Grape receiving courtyard
- 13 Grape crushing pad
- 14 Elevated steel walkway

1: FERMENTATION

2: ENTRANCE

3: ADMIN / BOTTLING LINE

4: MICRO - BOTTLE AGEING

5: WINE TASTING

FIGURE 70 (ABOVE): First Floor Plan - Entry Level from town/ Webersvallei Road

Scale 1:500

Note the rammed earth walls of the production areas of the winery facing east-west to act as thermal insulation in aid of keeping the interior passively cool.



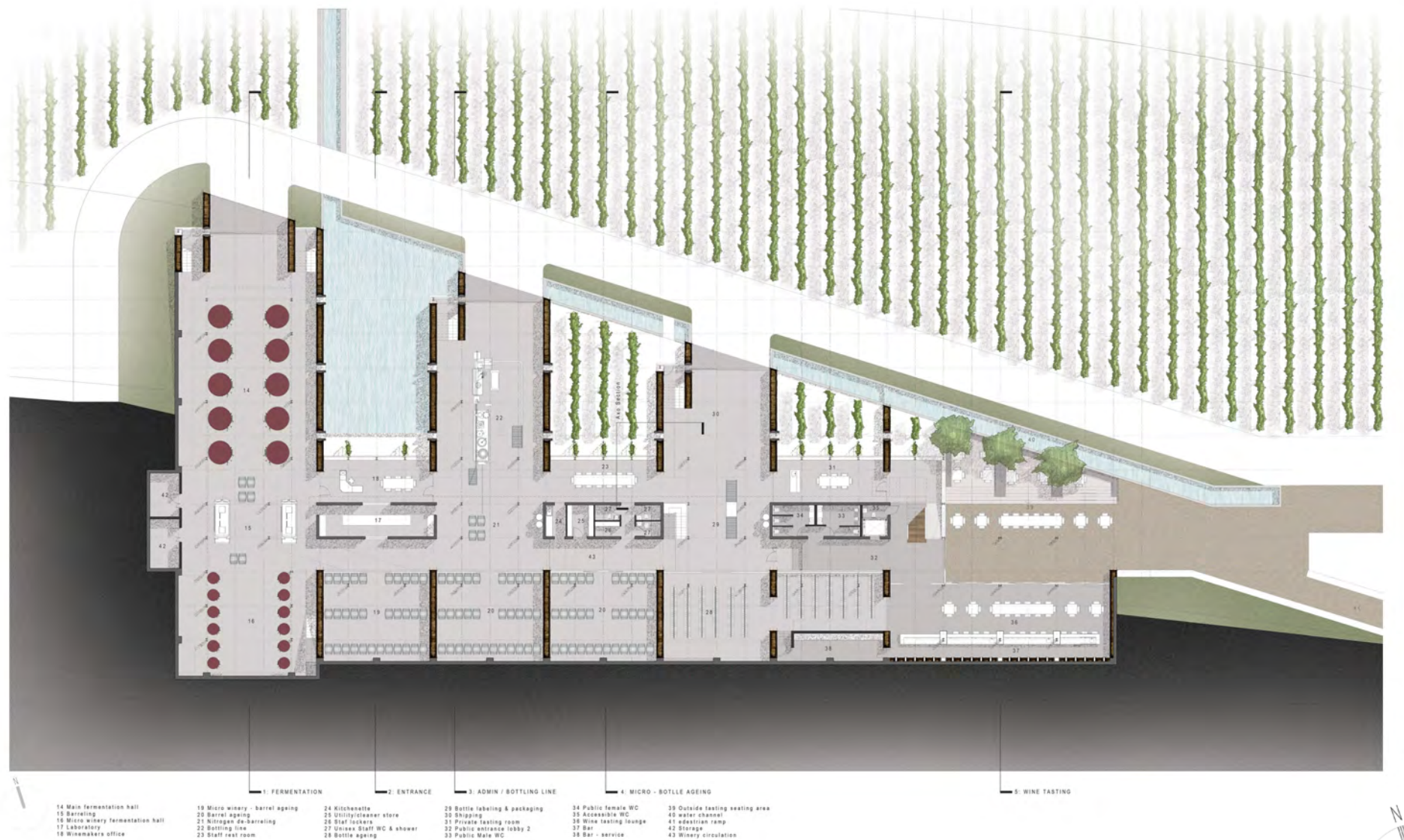


FIGURE 71 (ABOVE): Ground floor plan - Entry level from pedestrian spine

Scale 1:500

FIGURE 72: Isometric view of the first floor and ground floor plans of the winery illustrating the production process of the winery.
Scale 1:500

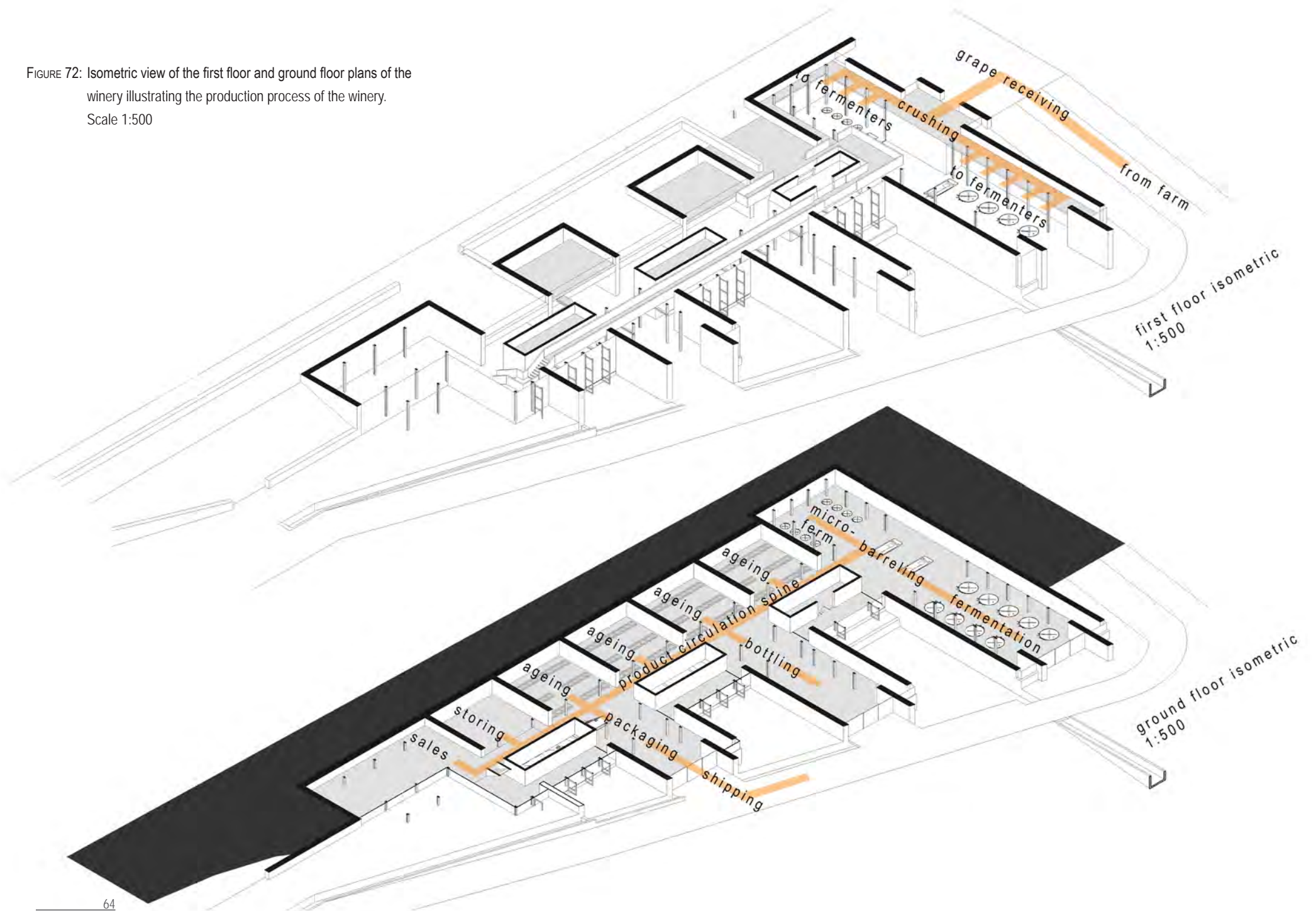
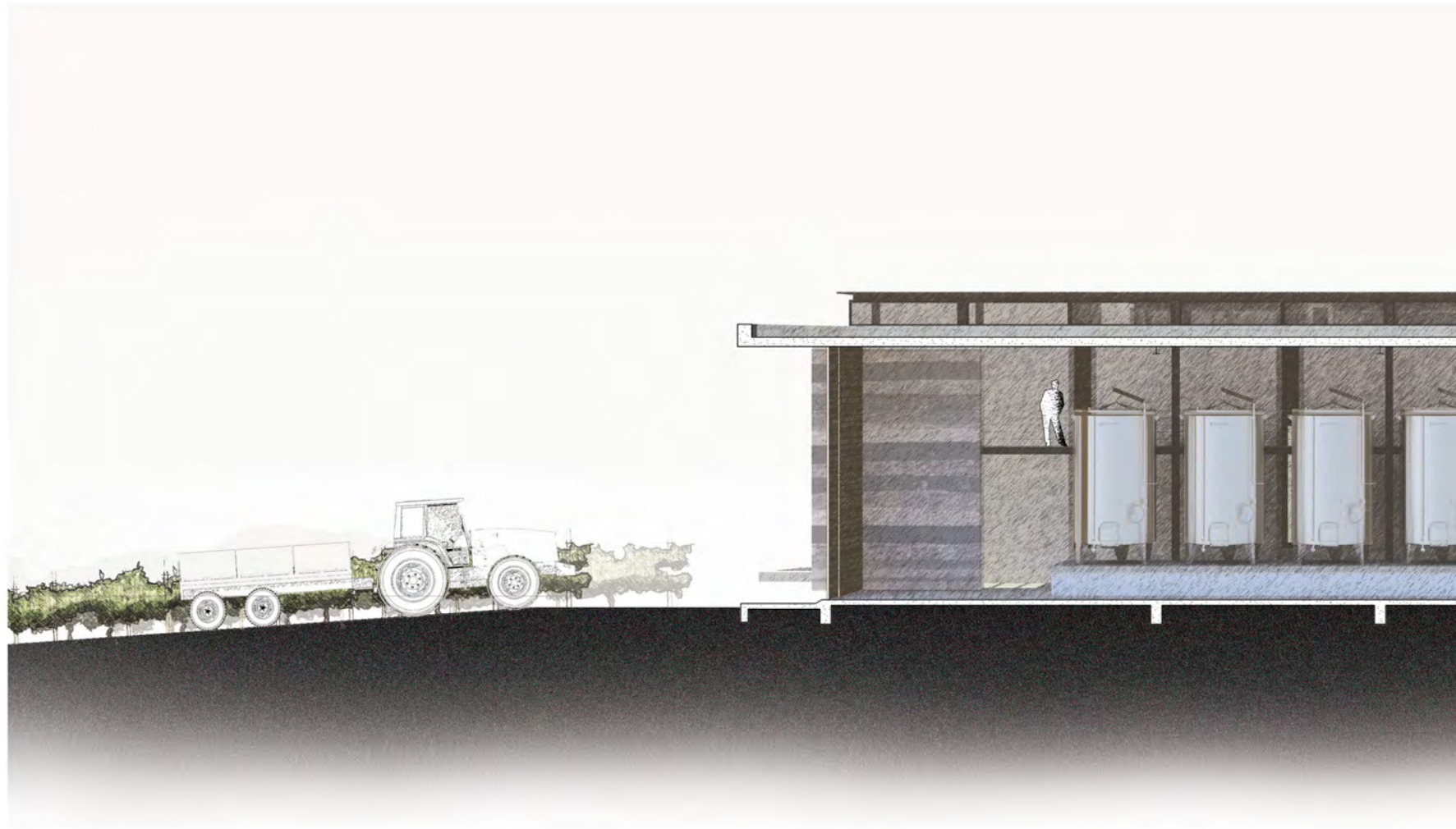


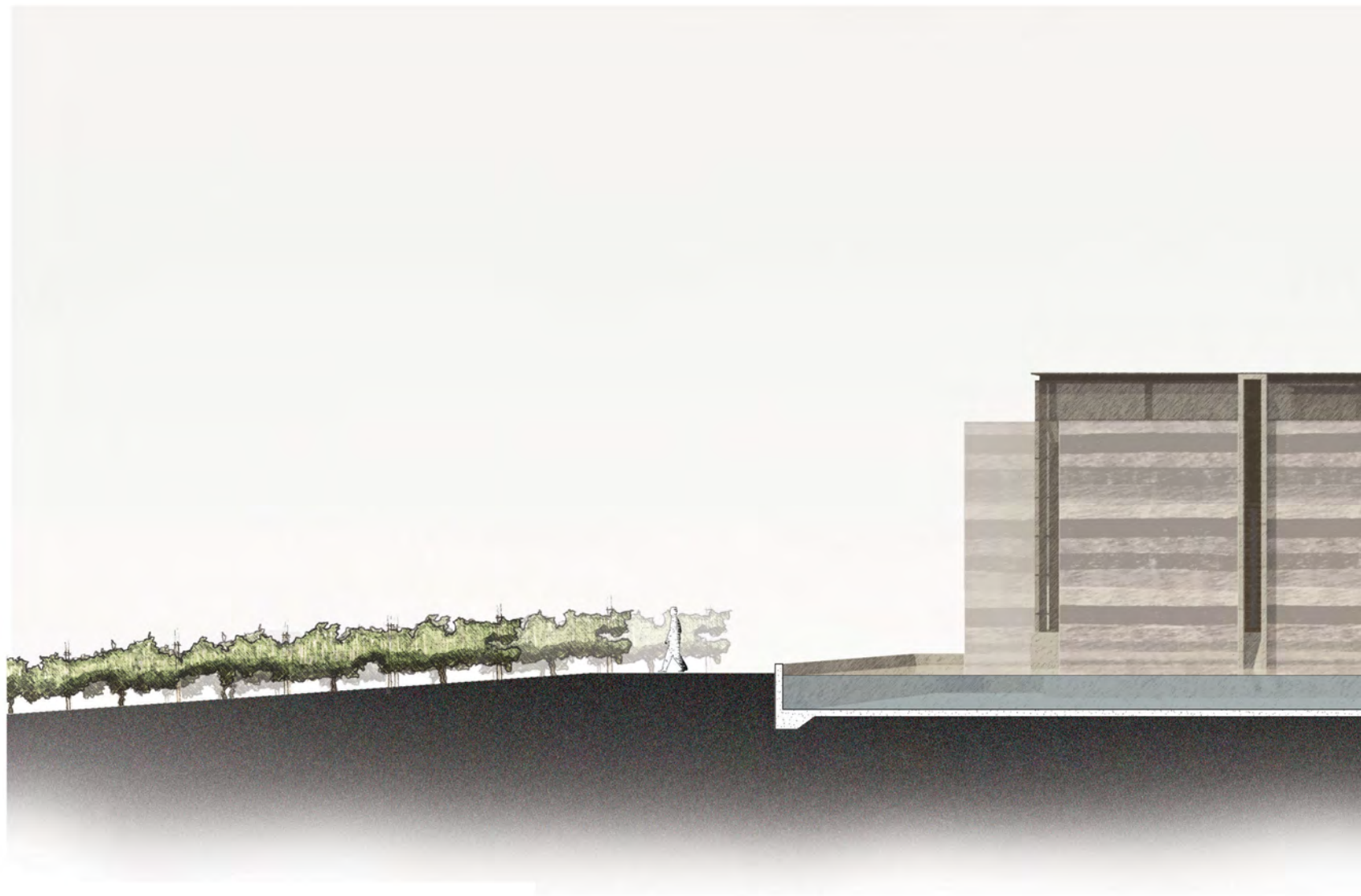
FIGURE 73: Isometric view of the first floor and ground floor plans of the winery illustrating the route the visitor takes through the facility. The route cuts across the production route of the wine, giving the visitor a full experience of the process. Note the three service blocks on the central spine of the building - these facilitate in creating the opportunity to have the visitor route diagonally above the circulation route of the product. This allows the product to constantly be in the view of the visitor. Scale 1:500



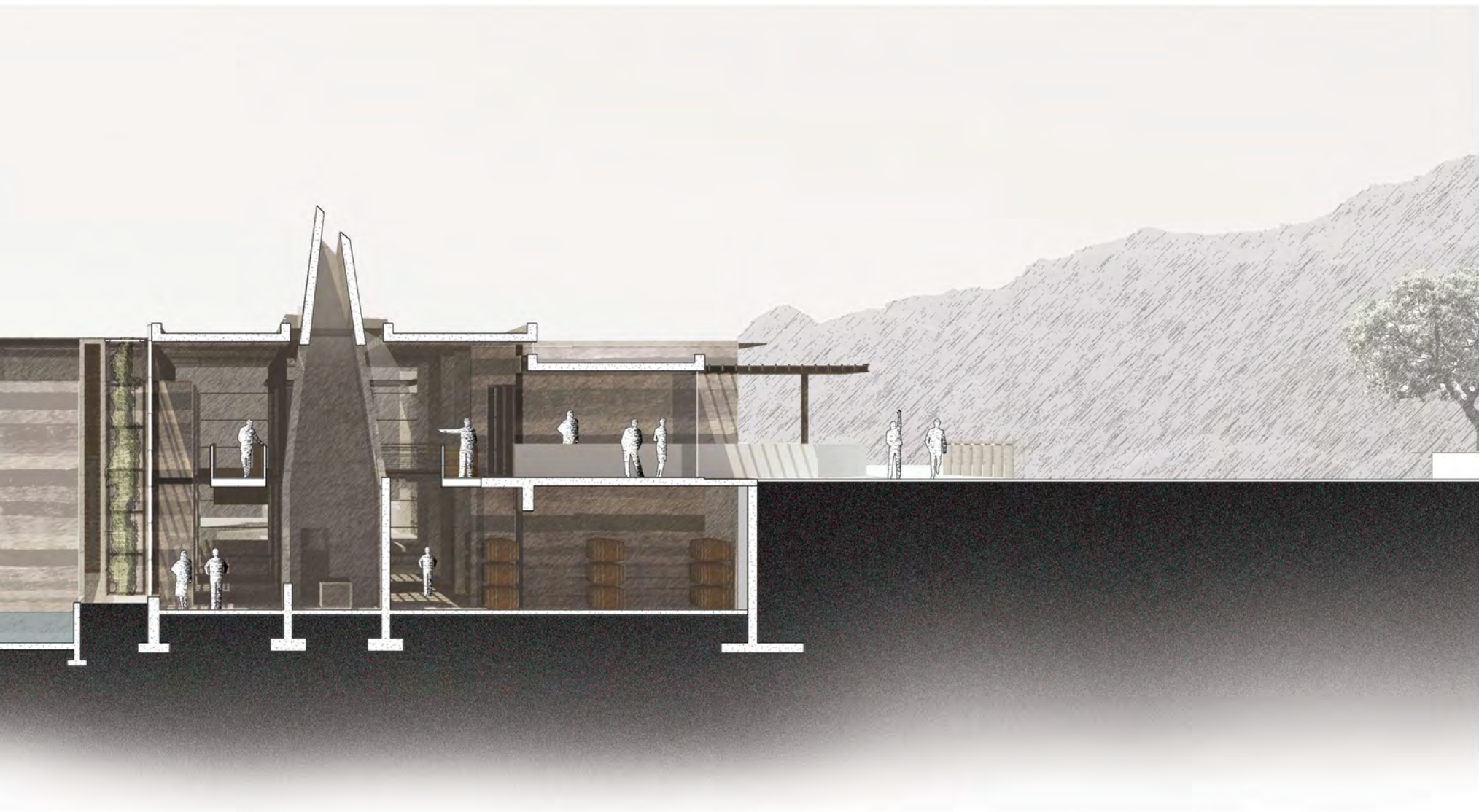


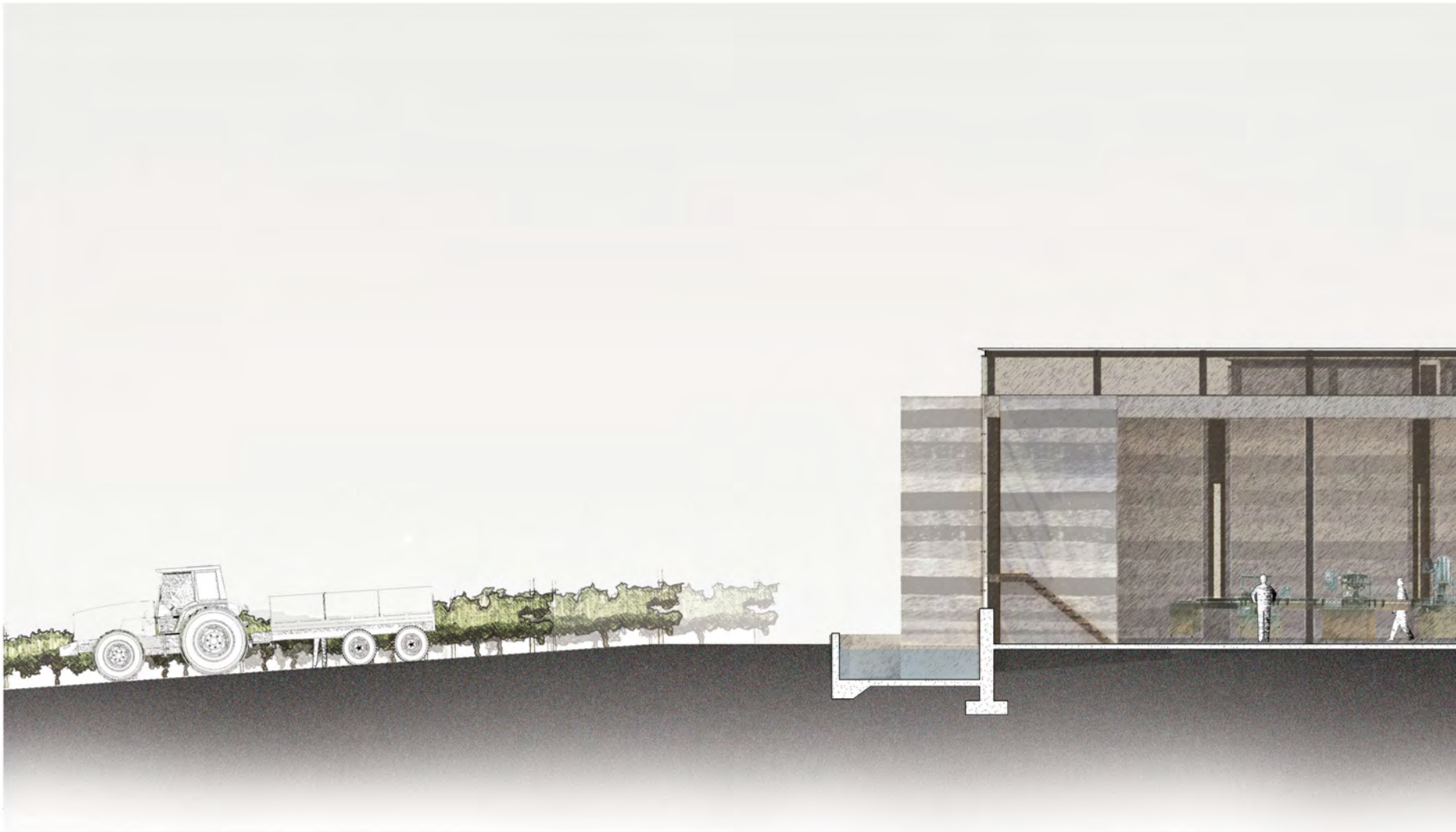
Section 1: Fermentation hall and visitor balcony
Scale 1:100





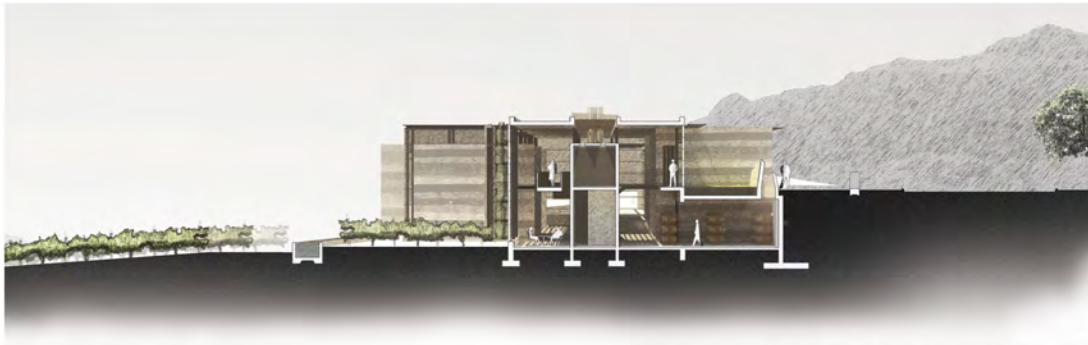
Section 2: Arrival / Laboratory
Scale 1:100 @ A3





Section 3: Administration / Bottling Line and barrel ageing
Scale 1:100 @ A3





SECTION 4: SERVICE BLOCK / MICRO BOTTLE AGEING



SECTION 5: PUBLIC WINE TASTING LOUNGE



SECTION 6: PUBLIC PROMENADE WALKWAY / HOUSING



Top: South (Street) Elevation
Bottom: North (farm) elevation
Scale 1:200 @ A3



CONCLUSION

The new typology for the contemporary wine estate should thus not start with a merely aesthetic approach to changing the built expression of the estate. The hidden possibilities that lie in the relationship between the visitor and the farm should be reinterpreted and utilised to reinvent the social structure of the farm.

Through celebrating the relationship between the visitor and the worker a much richer experience for both parties can be created spatially and experientially. For the visitor a chance to experience a wider range of every day activities on the farm and for the worker to gain better interaction with the visitor and through that have access to greater economic possibilities outside of the interest of the farm and towards the betterment of the community.

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9. ETHICS CLEARANCE

EBE Faculty: Assessment of Ethics in Research Projects (Rev2)

Any person planning to undertake research in the Faculty of Engineering and the Built Environment at the University of Cape Town is required to complete this form before collecting or analysing data. When completed it should be submitted to the supervisor (where applicable) and from there to the Head of Department. If any of the questions below have been answered YES, and the applicant is NOT a fourth year student, the Head should forward this form for approval by the Faculty EIR committee: submit to Ms Zulpha Geyer (Zulpha.Geyer@uct.ac.za; Chem Eng Building, Ph 021 650 4791).
NB: A copy of this signed form must be included with the thesis/dissertation/report when it is submitted for examination

This form must only be completed once the most recent revision EBE EIR Handbook has been read.

Name of Principal Researcher/Student: Anthonic Bernard Department: APG (School of Architecture, Planning and Geomatics)

Preferred email address of the applicant: anthonbernard20@gmail.com

If a Student: Degree: MArch (Prof) Supervisor: Nic Coetzer

If a Research Contract indicate source of funding/sponsorship: N/A

Research Project Title:
Contextualising the Contemporary Cape Winery: Jamestown, Stellenbosch

Overview of ethics issues in your research project:

Question 1: Is there a possibility that your research could cause harm to a third party (i.e. a person not involved in your project)?	YES	<input checked="" type="checkbox"/>
Question 2: Is your research making use of human subjects as sources of data? If your answer is YES, please complete Addendum 2.	YES	<input checked="" type="checkbox"/>
Question 3: Does your research involve the participation of or provision of services to communities? If your answer is YES, please complete Addendum 3.	YES	<input checked="" type="checkbox"/>
Question 4: If your research is sponsored, is there any potential for conflicts of interest? If your answer is YES, please complete Addendum 4.	YES	<input checked="" type="checkbox"/>

If you have answered YES to any of the above questions, please append a copy of your research proposal, as well as any interview schedules or questionnaires (Addendum 1) and please complete further addenda as appropriate. Ensure that you refer to the EIR Handbook to assist you in completing the documentation requirements for this form.

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	Anthonic Johannes Bernard	8/9/2014
This application is approved by:		
Supervisor (if applicable):		8/9/2014
HOD (or delegated nominee): Final authority for all assessments with NO to all questions and for all undergraduate research.		08/09/2014
Chair: Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.		