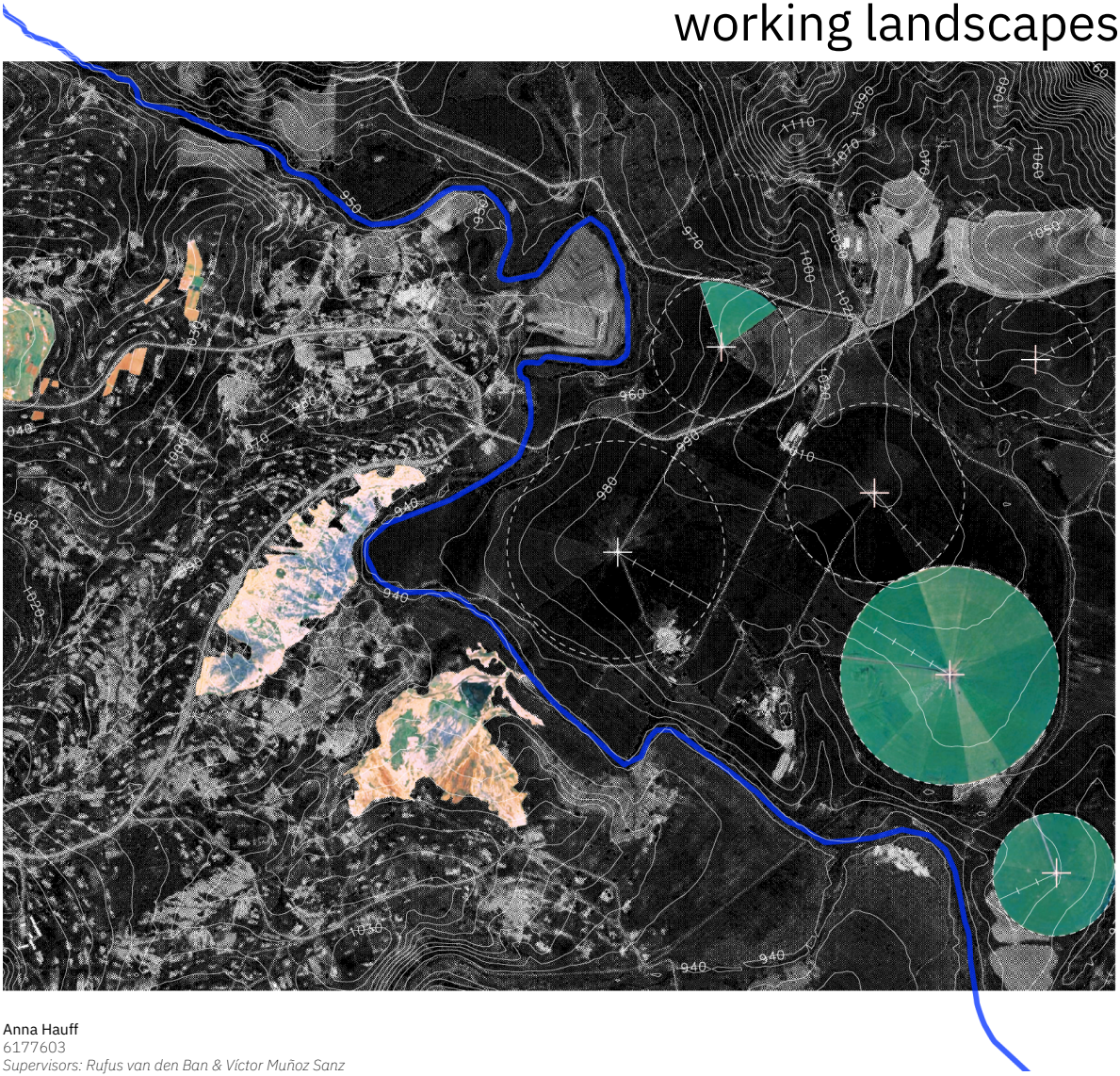
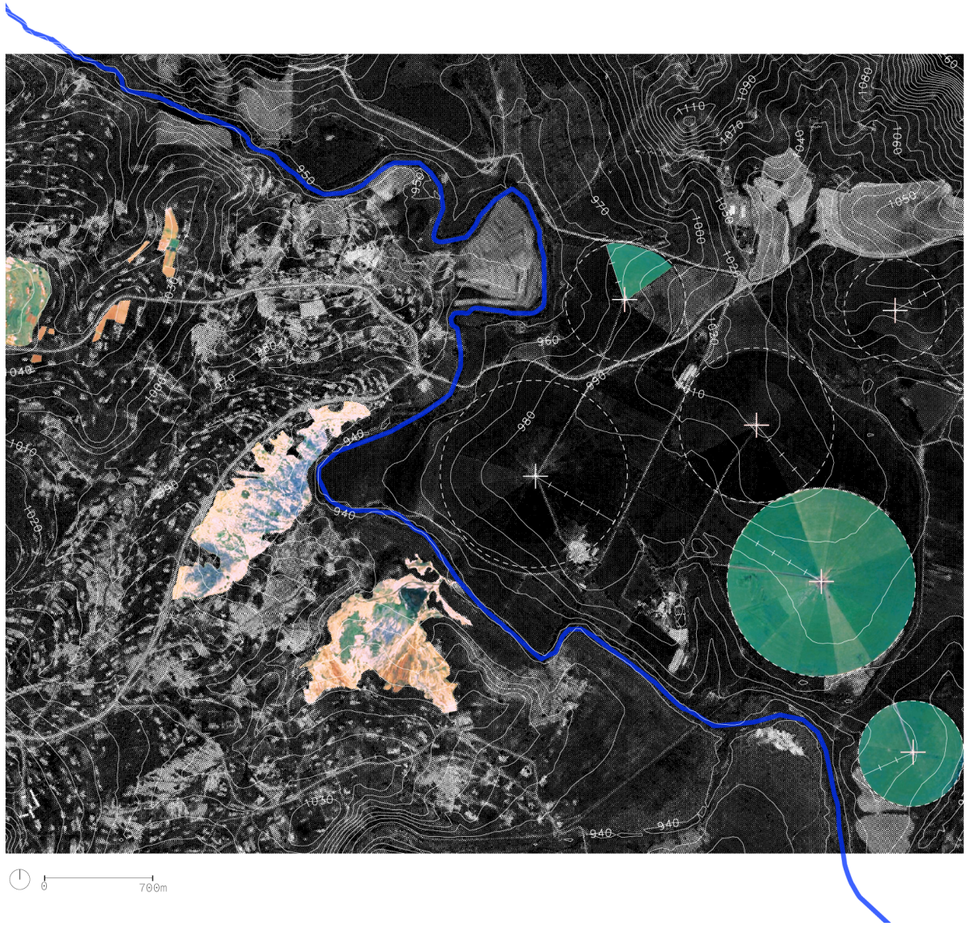
platformed:
education & the futures of working landscapes



Anna Hauff
6177603
Supervisors: Rufus van den Ban & Víctor Muñoz Sanz

Nguni cow and calf
Rockfontein farm, Ixopo
Anna Hauff, 2025

contents



Agriculture's footprint
former homeland and commercial dairy farming along the Umzimkulu river near Centocow, South Africa

what landscapes support the 'city'?

abstract

This project started with a simple question – what landscapes support the ‘city’? Hinterlands do not lie idle – often they are working landscapes, often they work to feed the city.

Agro – industrial systems are one of the most rapidly expanding spatial developments ((Brenner and Schmid, 2015). Yet their social and environmental implications largely remain invisible as these systems function as black boxes. This problem becomes more salient when considering landscapes which have been prestressed by exclusionary colonial legacies regarding land, mobility and knowledge.

This project uses the dairy farming landscape of KwaZulu Natal, South Africa as lens through which to examine the relationship between agricultural production, knowledge, people and other forms of life. This landscape was shaped by colonial and apartheid era policies of exclusion - creating a dual agricultural territory, which is being further stressed by climate and technological change. The indigenous Nguni cattle and the optimised foreign Holstein cattle embody this dual landscape – each represents two different systems of agriculture present on the same soil. The tension between these two systems drives both the research and design of this project.

The project subverts the colonial era short line railway by conceptualising the rail corridor as a spine and platform which connects the gap between mobility, knowledge and working landscapes as a piece of public infrastructure for regeneration as opposed to extraction. The architectural response of this project is the design of a generic rail platform typology with a context specific technical college attached to it - embedded in the productive landscape that many people were previously excluded from. Rather than being an insular institution, the college is conceived of as a series of interweaving platforms, which mediate different learning environments and link students, farmers and the public to each other and the wider territory. These platforms are centred around three interacting sets of relationships: knowledge and production; analogue and digital; non-human, human and post human actors

These sets of relationships also inform the physical construction logic of the building as each end of the Nguni - Holstein spectrum has an associated set of materials, construction and climate logics. The technical detail of the building structure itself embodies this heterogeneous landscape.

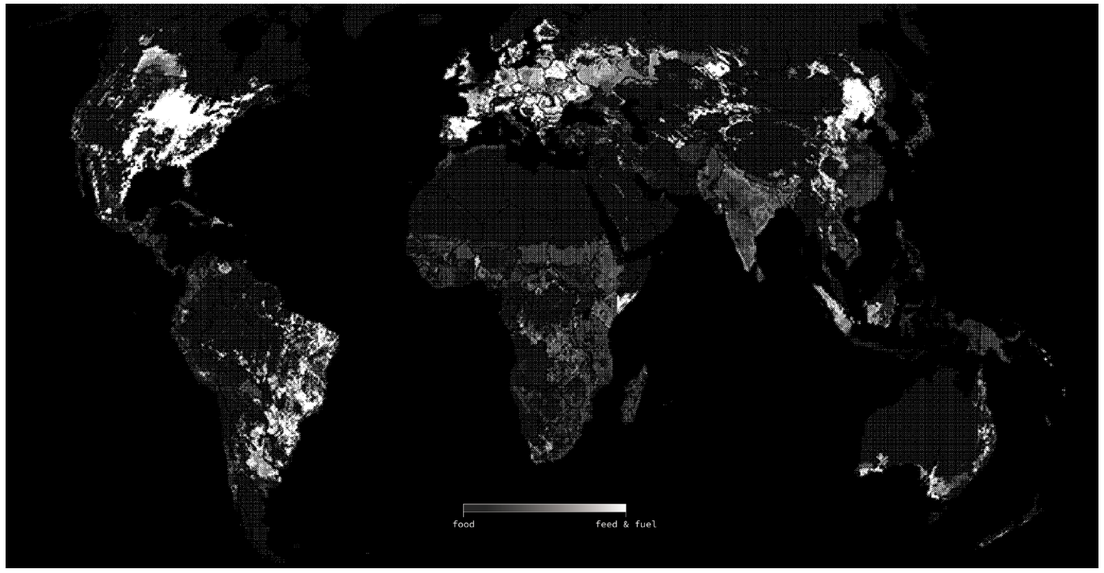
Ultimately, the project takes seriously Schumacher’s provocation and that agriculture lies in the tension between the “incompatibilities of opposites, each of which is needed” (Schumacher, 1973; 89). Thus, the technical college is as heterogeneous as the landscape it inhabits – within the tension, students do not inherent a top-down single system, but instead they inhabit, maintain and re-imagine the futures of working landscapes.

1.

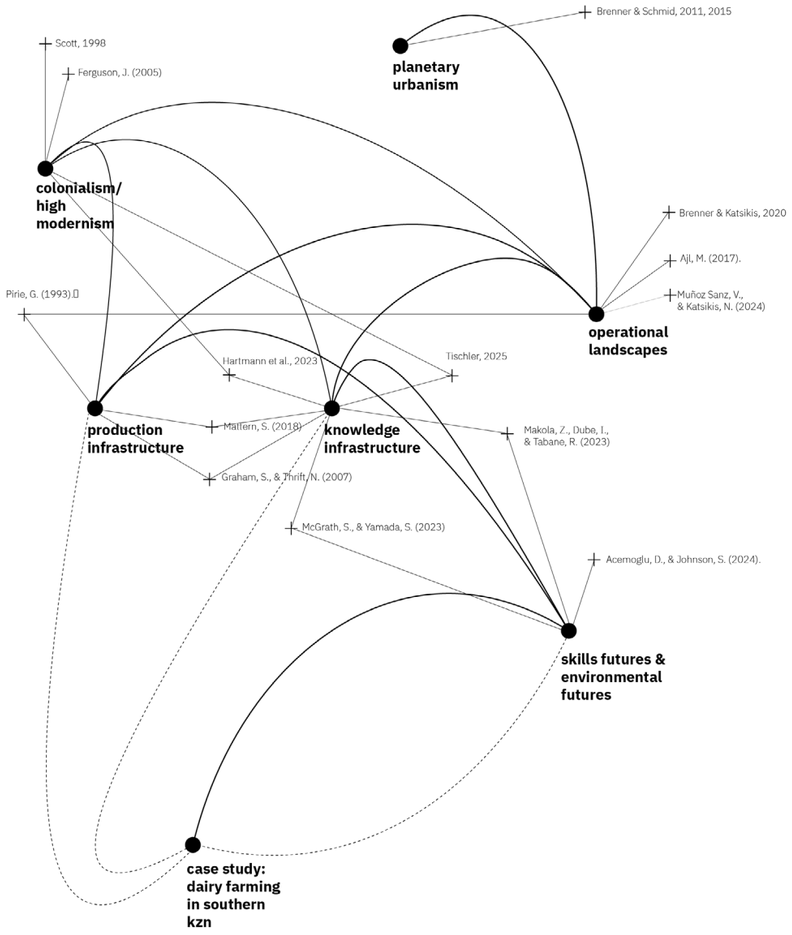
background & context

Systems of agro-industrial production have become one of the fastest expanding spatial developments – arising to support the rapid growth of urban centres. Yet these systems remain largely invisible as they have often been defined as 'rural' technical and economic processes external to the 'urban' (Brenner and Schmid, 2015). This has obscured the spatial implications of these infrastructures which have social and environmental ramifications. South Africa's colonial and apartheid era policies of exclusion (especially regarding land and education) have created systemic inequalities which make the political, social and environmental implications of the current food system infrastructures particularly salient

Systemic inequalities in South Africa's agricultural landscape have created broken relationships between productive landscapes, local skills and public infrastructure. This often results in physical disconnections between educational, and productive spaces and as well as public infrastructure. These broken relationships are further exacerbated by the effects technological and climate change as well as invisibilisation of these spaces and processes which occur outside of cities. this project aims to conceptualise or highlight the role architecture could play in being a thoughtful mediator between public infrastructure and production infrastructure within complex, sometimes inequitable, landscapes which contain assemblages of humans, non-humans, natural and artificial environments



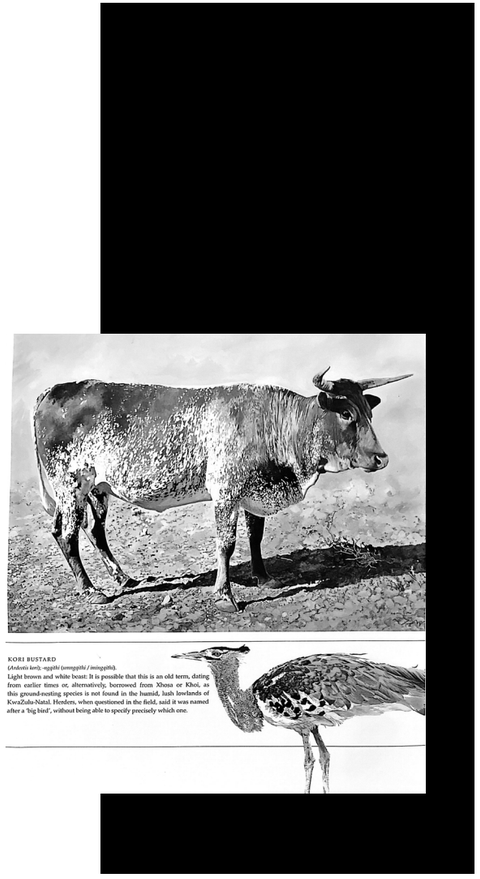
Agriculture's footprint
adapted from Global Landscapes Initiative, Institute on the Environment, University of Minnesota.



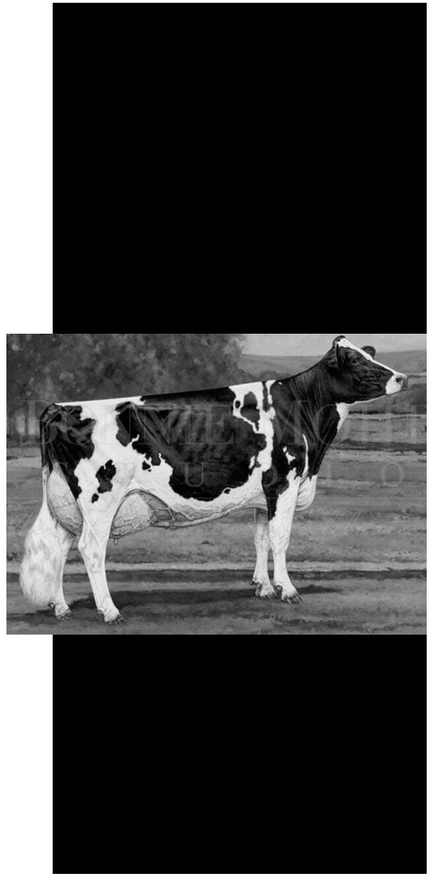
This project is grounded in the theories of planetary urbanism (Brenner and Schmid, 2012), with a particular focus on operational landscapes (Brenner and Katsikis, 2020). Therefore, infrastructure agriculture and logistics are understood as constitutive of urbanisation rather than separate external entities to cities. Colonial and high modernist theory reveals how both productive and knowledge infrastructures within operational landscapes are not neutral technical entities, but rather socio- technical systems which have impacts on spatial and social organisation.

Through this lens the role of architecture is viewed as a regenerative terminal which occupies gap between productive and knowledge infrastructure within hinterlands, to catalyse more just and resilient futures in time of technological and climate change. The southern region of the province of Kwa-Zulu Natal (KZN), South Africa provides the context in which this theory is applied. Disused rail infrastructure in southern KZN region is approached not as an obsolete object, but as part of the operationalization of the hinterland, which in this context means the industrialisation of agricultural production systems. Using map making as a research tool reveals how the current spatial structure of agricultural production evolved with the rail infrastructure. The local dairy farming industry provides a case study as a lens to reveal how the hinterland operates in this context and its links to various forms of knowledge.

To understand the various systems, materials and knowledge operating in this landscape the metaphor of a ‘heterogeneous network’ is employed a way of conceiving how “society organizations, agents and machines are all effects generated in patterned networks of diverse (not simply human) materials” (Law, 1992: 380). Often these networks are simplified and represented by ‘single point’ actors or punctualities, as referred to by some actor network theorists (Law, 1992). The case study reveals two such punctualisations in this landscape - the indigenous Nguni cow and the Holstein dairy cow. The Nguni is a punctualisation of the cultural and environ-mental systems in which this animal has evolved over thousands of years – it is deeply connected to both the land and Nguni people*. On the other end of the spectrum, the Holstein represents the rapid pursuit of optimization and industrialization of living systems. This relatively new system of agriculture occupies the same territory as the Nguni cow. However, the animal in this system has been optimised over mere decades to be more efficient, to suit new tools, techniques and machines. Therefore, the Holstein becomes the cyborg neighbour to the Nguni cow.



Nguni Cow
Leigh Voigt in Abundant Herds (Poland and Hammond - Tookes, 2004)



True Type Model Holstein Cow
Bonnie Mohr, 2012

2.

literature review

The work of Neil Brenner and Christian Schmid has highlighted the need to understand the "more-than-city landscapes" These supposedly non-urban landscapes constitute what is typically deemed as 'urban'. Therefore they are "internalized into the very core of the urbanisation process" (Brenner and Schmid, 2015: 174) and should not be externalised from what is considered as urban structures and processes (Muñoz Sanz and Katsikis, 2024). Similarly, Hartman and Tischler (2023) argue that global history documents transnational networks and processes in relation to urban or industrial contexts when in fact rural contexts were affected by the same processes and they too have become 'globalized' (Hartmann and Tischler, 2023).

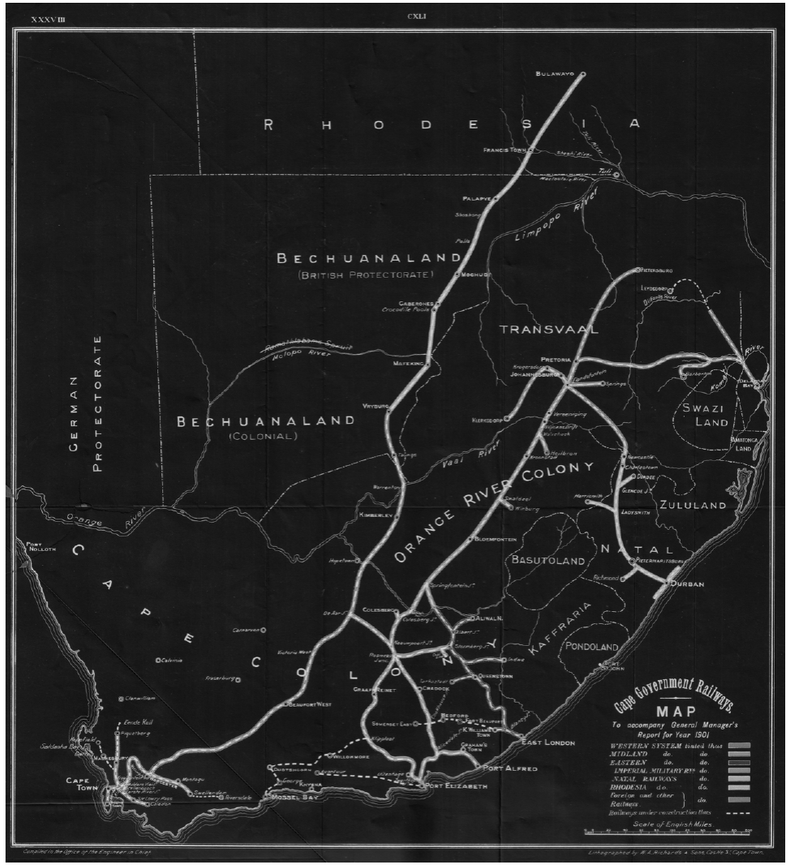
Operational landscapes and hinterlands

Brenner and Katsikis (2020) point out that before the 1970s, scholars did pay attention to these non urban landscapes and considered them as part of the urbanization discourse. However, in the last fifty years the hinterland has faded from urban theoretical discourse. This is in spite of the fact that woven into many 'hinterlands' across the globe are strategic hubs, corridors and concession zones, which are typically operationalised through transnational corporations and national states (Brenner and Schmid, 2012). The operationalization of these landscapes facilitates forms of infrastructure related to: extraction (of resources), production (of energy and industrial agriculture), and logistics (systems which underpin the supply chains of extraction and production). These various infrastructures uphold the "relentless growth and consumption imperatives of the world's major cities" (Brenner and Schmid, 2015: 174). Researchers and scholars who study urban metabolisms have narrowed this gap in discourse by extensively quantifying the flows of material and energy between hinterlands and cities. However, according to Brenner and Katsikas (2020) the hinterland has remained like a 'black box' in which metabolic flows move in and out of – how this box actually operates receives less interrogation. The black boxing of these landscapes essentially means that that they become unintelligible.

When something "is intelligible you have a sense of participation and when something is unintelligible you have a sense of estrangement" (Shumacher, 1973: 64). Therefore this 'black boxing' not only impacts landscapes in a physical way – it affects access to knowledge. This means that the role of education within this 'black box' needs to be more than mere training and accumulation of facts – it needs to provide space for ideas that make the current state of the world and peoples own contexts intelligible (Schumacher, 1973).

The South African context: colonial high modernism legacies

In South Africa, there is a considerable body of research which unpacks how the colonial and apartheid mining industry created an extractive set of infrastructures designed to export resources and import cheap labour for the mines. This is known as South Africa's Minerals – Energy Complex (MEC) - a key political – economical concept which describes how the relationships between cheap energy generation, cheap labour and mining came to underpin how the country functions (Swilling, 2023; Padayachee, 2010). This has spatial implications too as most of the country's core infrastructure is set up to serve the MEC. Colonial rail infrastructure was first set up to extract gold and diamonds, however coal and iron ore now make up the bulk of freight rail. During the early to mid 20th century the state built an extensive set of rail infrastructure for the agriculture industry and to reach new cheap labour for the mines (The Economist, 2023) (Pirie, 1993). Despite the fact that rails contributed "massively to shuttling migrants between the countryside and the Rand [Johannesburg and environs] , the network was primarily constructed for and prioritized freight transport"(Pirie, 1993: 728). The current regional railway map still reflects this despite the recent collapse of the state rail system. Currently there are no permanent passenger lines in the country apart from metros in some cities. According to the state released document "Roadmap for the Freight – Logistics System in South Africa" (National Treasury, 2023)) bulk lines make up only 12% of route length but have the 65% of freight potential. The roadmap's conclusion that bulk material lines need to be prioritized reinforces what Ferguson refers to as "segregated mineral extraction enclaves" characterized by heavy capital investment, with few benefits to local communities (Ferguson, 2005). These networks link discrete points and operate in a "point to point fashion", typically from mine to port. Short lines have been out-competed by roads and trucking logistics, whilst South Africa's major transportation investments have been in highways (National Treasury, 2024). What this could risk is the opportunity to move beyond "post-developmentalist abstractions which seek to replicate the American model of labourless agriculture, endless highways and petroleum use, and, of course, megalopolis, and impose it on the rest of the planet" (Ajl, 2017: 12).

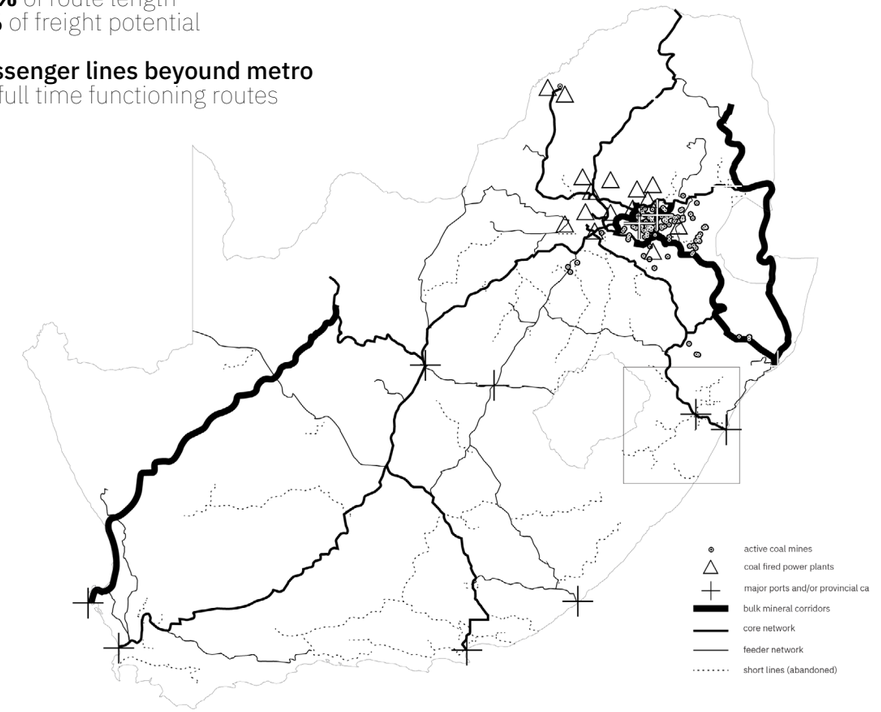


South African rail, 1902

bulk mineral lines
12% of route length
61% of freight potential

short lines
35% of route length
1% of freight potential

passenger lines beyound metro
no full time functioning routes



South African rail routes, provincial capitals and major ports

Knowledge and the hinterland

Disconnections

The short rail lines are mostly embedded in agricultural hinterlands which operate differently to mining in that they are not finite, reinvest in landscapes, and are embedded across territories not discrete points (Ferguson, 2005). Agriculture is often referred to as an 'industry' – a term which fails to represent the tensions within the landscape created by the interaction between living and non-living systems. Mining and other industries essentially strive to eliminate the living factor, including humans, to turn "productive processes over to the machines" (Schumacher, 1973: 89). Schumacher (1973) argues that industry could be defined as "an offensive against the unpredictability, unpunctuality, general waywardness and cussedness of living nature, including man" (Schumacher, 1973; 89).The elements of uncertainty native to living systems conflict with the pursuit of frictionless production systems (Munoz Sanz, Kuijpers & Jaoude, 2018). How then can agriculture be considered an 'industry' when its fundamental principle is life? It is here, in this agricultural landscape where 'real life' is produced through the "incompatibilities of opposites, each of which is needed" (Schumacher, 1973; 89).

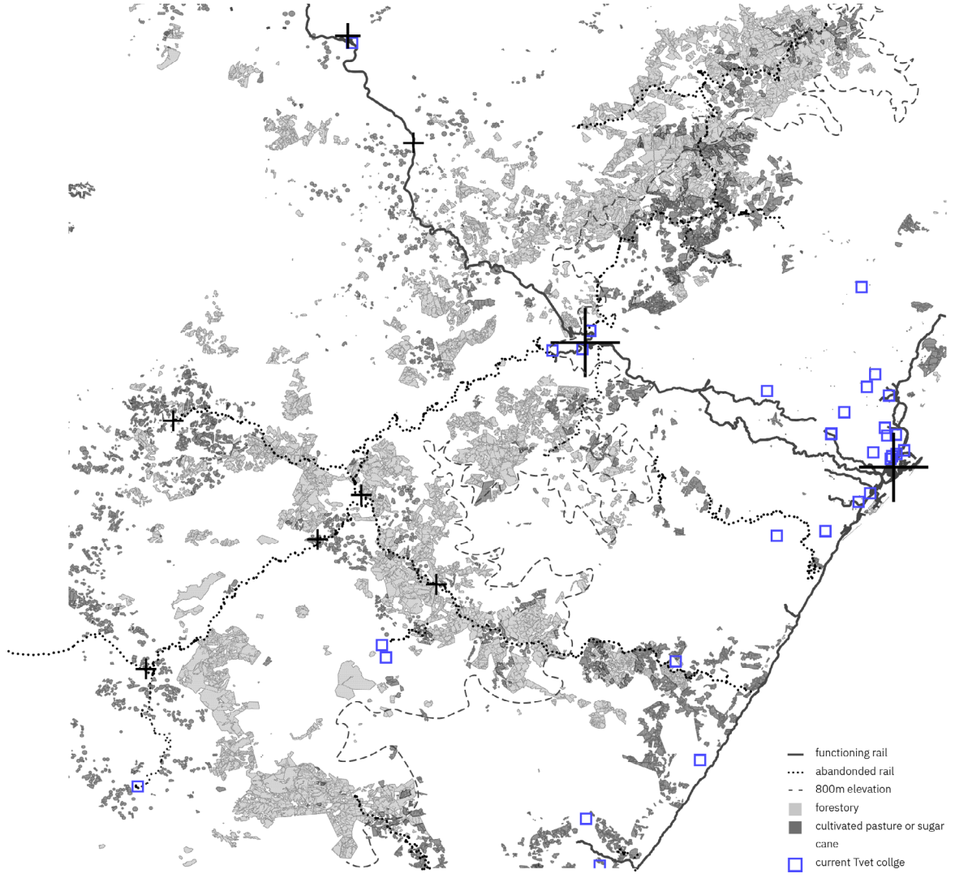
South Africa has a 'world class' agricultural sector (The Economist, 2023). This is not just a contemporary phenomenon, historically it was linked to agrarian reforms in other parts of the world. Because of the " transnational circulation of knowledge on conservation farming techniques, irrigation agriculture, the cultivation of cash crops, vegetable gardening, nutrition, and pedagogical concepts, this supposed African periphery was actually at the centre of transnational agrarian reform" (Tischler, 2025:5). However, South Africa's agriculture is dualistic in nature because of colonial and apartheid policies which sought to segregate and marginalise Africans. Notably the 1913 Land Act (restricted the majority Black population to only 7% of South Africa's land) and the 1953 Bantu Education Act (the creation of an inferior, segregated education system for Black South Africans, which intended to prepare them for menial labour).

While the Bantu Education Act came into effect in 1953 it only calcified earlier segregationist trends towards access to knowledge. According to Tishler, 2025: 14:

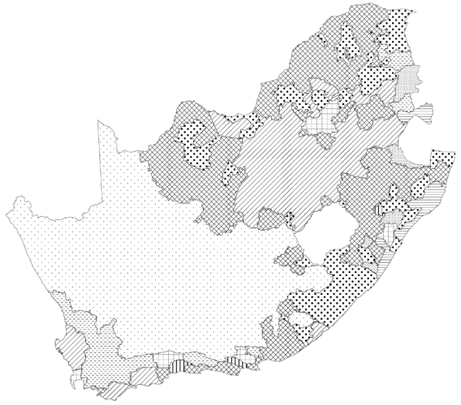
"South Africa's biopolitics of rural reform was emblematic of broader trends towards increased state control that previous research has referred to as 'high modernist' social engineering".

From this perspective the state sought to control the social mobility of Africans, while agricultural education increasingly became a way for the government officials to control what people ate to ensure the labour force had healthy bodies to increase their labour productivity.

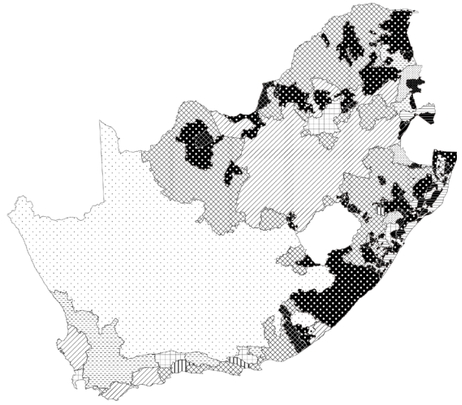
Even before the Bantu Education Act was implemented South African and US social scientists believed that Africans and African Americans should receive education in practical agricultural tasks instead of 'book knowledge' – in what was termed 'adapted' education. (Tischler, 2025). This legacy of 'book knowledge' being superior to practical technical knowledge still endures today. This not unique to South Africa, in other parts of the world this form of education is linked social injustice (McGrath & Yamada, 2023). While applications to universities continue to increase in South Africa (with not enough placements for students) enrolments in technical and vocational Training have declined (Makola et al., 2023 ; Burger, 2023). The social stigma attached to technical education is further reinforced by the persistent gap between educational offerings and industry. This gap is in danger of widening because of "rapid technological and industrial change" McGrath & Yam-



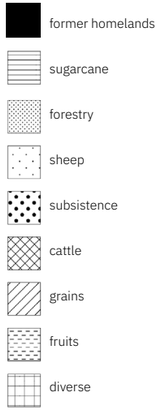
Rail, agriculture and technical colleges
mapping the territory to expose relationships between production and knowledge infrastructure



Agricultural regions of South Africa



Agricultural regions of South Africa overlayed with former homelands



ada, 2023:1. Furthermore McGrath & Yamada (2023) argue that for this type of education to succeed it need it cannot be isolated – it should be linked to other national development projects.

The model of high modernism not only has social engineering components but also seeks to boost agriculture production using scientific knowledge and logic. This is often characterized by top down deterministic projects whose level of abstraction and dislocation from context is ironically unscientific, as argued by Scott (1998). This model of extensive rationalization often fails to "represent the space in which farmers plant crops-its microclimates, its moisture and water movement, its microrelief, and its local biotic history" (Scott, 1998: 262).

As early as the 1970s, economists such as Francis Stewart began to point out that importing technologies into developing countries does not always work, and in fact sometimes increased poverty and inequality. Often this is not because of the physical technology itself but because of how it was developed – essentially what knowledge was used and for whom. This is because technologies parachuted in from the global north were "inappropriate" solutions for the real needs and realities of contexts which differ geographically, politically and socially. Agriculture in Africa is illustrative of this problem because " high and middle income countries account for almost all the research spending on agricultural technologies" (Acemoglu and Johnson, 2024: 333), meaning that highly capitalised agricultural technologies developed for the West is often mismatched with needs of African farmers who, for example, will need to control different pests even if growing the same crops as in Europe or USA (Acemoglu & Johnson, 2024). This phenomenon not only contained to tools and technology – it also reshapes bodies of living creatures. In the context of KZN, the heterogeneous characteristics of Nguni cows' coats and bodies resulted in colonists considering them impure 'scrub' animals (Bayer, et. al. 2004). However, the heterogenous genetics of these creatures has resulted in animals highly adapted to their environment with resilience to disease and low-quality feed. The vast vocabulary of analogies and metaphors used by Nguni speaking people to describe their cattle shows an acute awareness of the local environment of the Nguni cow. If one " is not familiar with relevant (and sometimes very localised) local phenomenon, a full comprehension of the terms and their association is impossible" (Poland et. al, 2003: 35). Often the cattle are named after local birds, insects and

vegetation, amongst many other hyper local artefacts and practices. The failure in understanding the Nguni cow and its natural environment resulted in colonists insisting that Ngunis are inferior cattle and caused local people to crossbreed their Ngunis with 'superior' homogenised breeds imported by colonists. The favoured foreign breeds are more optimised for production output but lack the resilience and adaptability of the Nguni – they require more resources to be kept healthy and disease free. Much like the aforementioned importation of technology, the importation of foreign cattle breeds represents a dislocation from contextual knowledge, which is sometimes unscientific (Scott, 1998).

Maintenance: keeping the landscape operational

Alongside the development of techniques and technologies and infrastructure, the is an often-underappreciated element which enables their continued function. This is the " invisible work" of "maintenance and repair that continuously surrounds infrastructural connection, movement and flow "(Graham & Thrift, 2007: 18). Mattern (2018) points out that Graham & Thrift, (2007) identify breakdown and failures as the " means by which societies learn to reproduce" as improvisation and adaption are key to the repairing failing systems or technologies .

The tendency of technological advancement towards automation is not inevitable, but rather shaped by decisions made people. (Acemoglu & Johnson, 2024). Russel and Vinsel (2016) argue that:

"A focus on maintenance provides opportunities to ask questions about what we really want out of technologies. What do we really care about? What kind of society do we want to live in? Will this help get us there? We must shift from means, including the technologies that underpin our everyday actions, to ends, including the many kinds of social beneficence and improvement that technology can offer. Our increasingly unequal and fearful world would be grateful".

3.

The following drawinfs were made as a reseach tool to better understand the relationships berween produtive infrastructure, knowledge and jobs on a commercial dairy farm in southeirn KwaZulu-Natal. This analysis surfaces patterns and conclusions that literature alone cannot esilty reveal.

Figure 3.1

This diagram was made to understand how knowledge and production infrastructure relate to each other within the context of the Holstein dairy farm. What this diagram highlights is that many of the productive and knowledge infrastructure are in some way related to the soil. This forms the foundation of the dairy farming activity in this context and highlights what Scott (1998) warns is lost in extremely high modernist agriculture system – local climates, moisture, biomes and living systems not fully optimisable frictionless entities that labour less agriculture can fully substitute. Within this system is work which relates to knowledge that needs to be applied to many different situations. Technical vocational jobs, which historically have been undervalued, play an important role in this system. Often people's work in this agricultural context requires them to move through multiple landscapes and mediums – it is defined by this factor rather than repetitive predictable tasks which could be automated. For example, an electrician will be solving a problem in a dairy on one day and then figuring out an electrical fault in a pasture at a centerpivot the next day. This links the 'invisible work' of maintenance and repair which Graham and Thrift (2007) argue allows the continuous operation of many infrastructures

Figure 3.2

The following diagram then abstracts this system in two different scenarios – the first being summer conditions when the grass growing conditions are most favourable and a second condition which represents a winter scenario when the farm is cooler and receives very little rain - which results in poorer grass growing conditions for the cows. The purpose of this diagram is to trace how jobs move through the landscape. In favourable climate conditions people and cows move through multiple environments (between pastures, walkways and dairies for example). In winter the movement patterns of both people and cow's contract. Cows spend less time on pastures and food is stored for consumption on ' feed pads'. In extreme cases such as drought, this phenomenon is exaggerated as the farm begins to unplug from the landscape and plug into logistics to continue operating.

Figure 3.3

The this graphic overlays El Niño and La Niña events with the rainfall cycles of southern KZN – making visible the drought patterns triggered by El Niño and floods

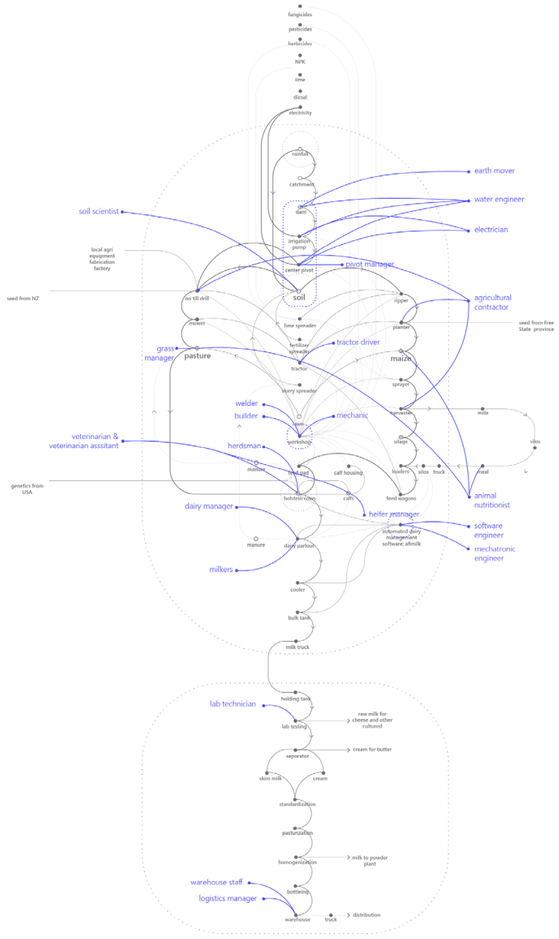


figure 3.1
production infrastructure (grey)
knowledge infrastructure (blue)

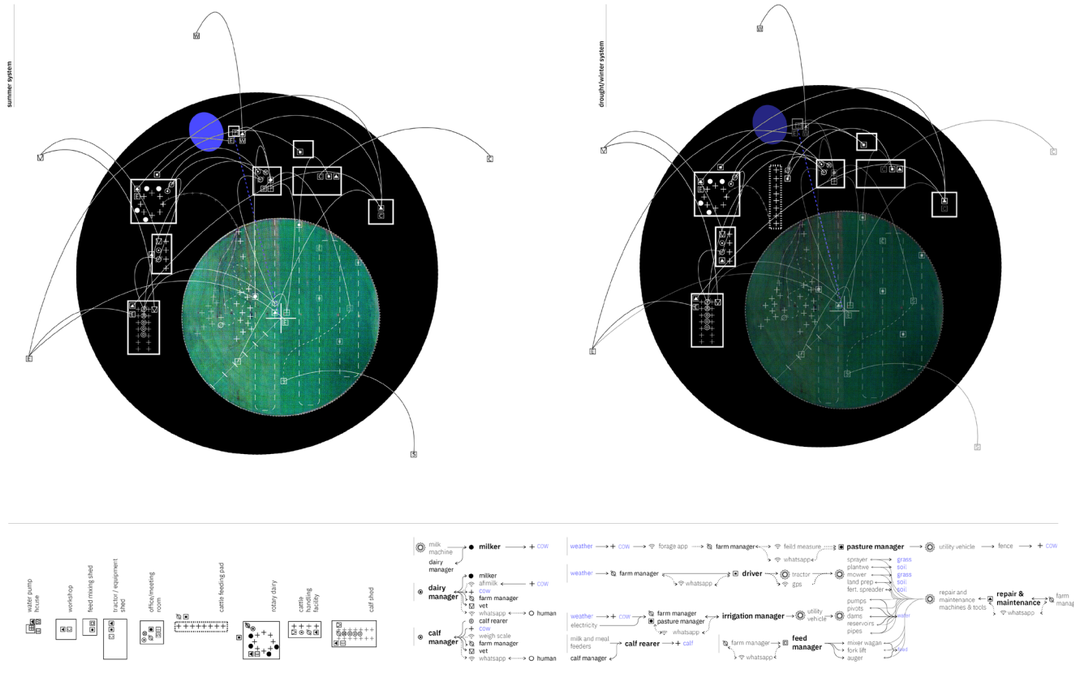


figure 3.2
tracing how people and cows move through the farm in summer and winter

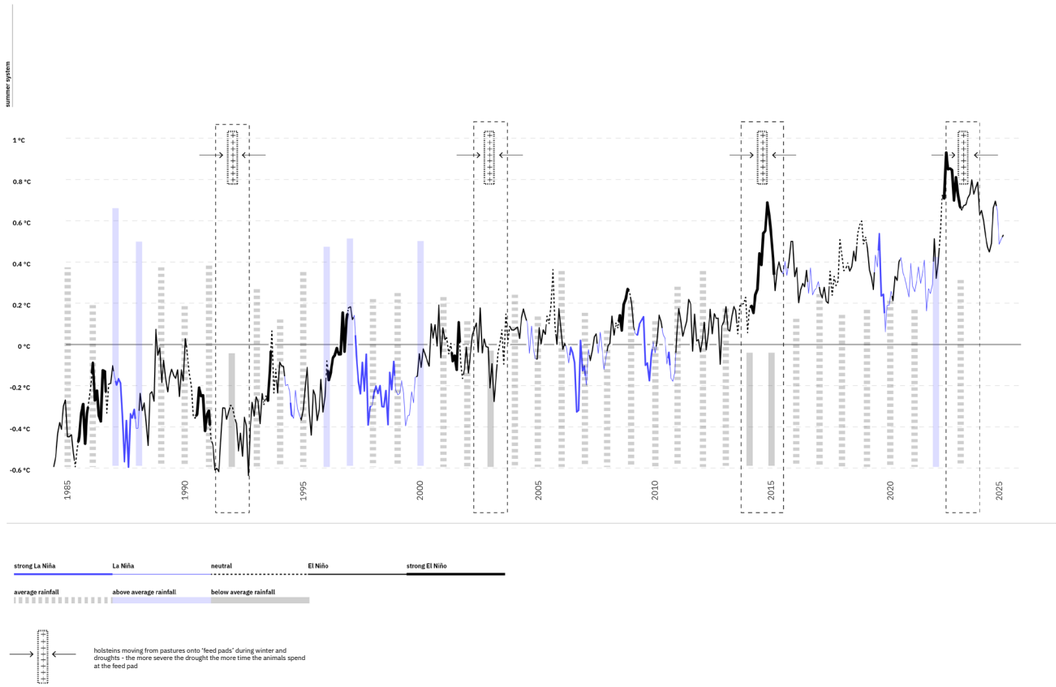


figure 3.3
El Niño and La Niña plotted against average annual rainfall for southern KZN

that accompany La Niña. Furthermore, the effects of the El Niño and La Niña events are exaggerated by climate change (World Meteorological Organisation, 2022). In the KZN context droughts trigger the dislocation of the pasture based dairy farm from the landscape to a 'feed pad' orientated system – which becomes easier to automate. The uncertainty of the climate not only has environmental ramifications but also disconnects jobs and animals from the landscape – this system is more spatially compressed and becomes a platform for automation.

Working in this way and producing these research drawings revealed some conclusions I would not have made by only looking at literature. Most notably how climate uncertainty becomes a dimension of agricultural automation. In drought conditions people and animals environments become less variable, as their jobs become easier to automate. Together these investigations reveal how climate and technological change disconnect the farm from the very soil it relies on and externalises its inputs elsewhere.

analytic drawings

4.

synthesis: from punctuations to programme

The research reveals how the hinterland operates as a ‘black box’ - parts of these operational landscapes become unintelligible furthering a sense of exclusion already present in landscape deeply affected by colonial and apartheid are exclusionary policies. This heterogeneous landscape operates in the tension between living systems, technology, and the physical separation between knowledge production infrastructure. The literature and case study reveal how technical vocational jobs keep this landscape operational. Jobs which require movement through different environments - repair, maintenance and care for living and non living systems are difficult to automate. Yet often these are the skills which are socially stigmatised and neglected as enrolment in technical education declines in South Africa (Makole et al., 2023). These factors raised the question of how the technical college can be rethought and valued as an institution. Advocating for the disused rail infrastructure to be reactivated and linking this educational infrastructure to a platform of access and wider networks of mobility refuse the separation between rural and urban .

Schumacher (1973) argument that industry seeks to eliminate the “ waywardness of nature” as well as the uncertainty which surfaces as a result of climate change gives a clue to how architecture should respond to this landscape - it needs to accommodate unpredictability through program, construction logic and detailing.

From punctuations to programme
Figuere 4.1

This analytical drawing synthesis the research by mapping out the spectrum created by the systems representing by the Holstein and Nguni cows. This spectrum can be further broken down into three conditions: the veld, field and feed. The veld represents the system closest to the Nguni’s natural state – embedded in local ecology, drought tolerant and adaptive. The feed represents the extreme opposite end of the spectrum where the Holstein is entirely removed from the field and plugged into a highly globlised system of opertion. The field condition has the potential to operate as a middle ground where the tension between both systems can exist. Across these three conditions the drawing tracks sets of questions: what are the traits of these conditions? What tools and technologies are present? What knowledge – practical and theoretical – is needed? Finally, what platforms and spaces would make this knowledge accessible?

This method of determining the programme of the project helped to produce a concept which is heterogenous in character and holds different systems in tension rather proclaiming one single solution. The programme is responsive to climatic conditions, the advancement of technology and uncertainty – both climatic and the future of work within the landscape.

Interweaving platforms:

The programme of the new technical education platform (grounded in the local dairy industry) is directly connected to the station platform node (therefore the territorial logic) and is conceived of 5 connected sub-platforms:

+ move
+ maintain and care
+ make
+ sense
+ communicate

These platforms are centered around three interacting sets of relationships

+ knowledge and production
+ analogue and digital
+ non-human, human and post human actors

These sets of relationships also inform the physical construction logic of the building as each end of the nguni - holstein spectrum has an associated set of materials, construction and climate logics. The technical detail of the building structure itself embodies this heterogeneous landscape.

The programme mediates between these supposedly incompatible systems - placing knowledge about precision technology alongside hands on maintenance and care and physical connection to the landscape. This allows students to have agency through the access to different forms knowing and doing.

synthesis: from punctuations to programme

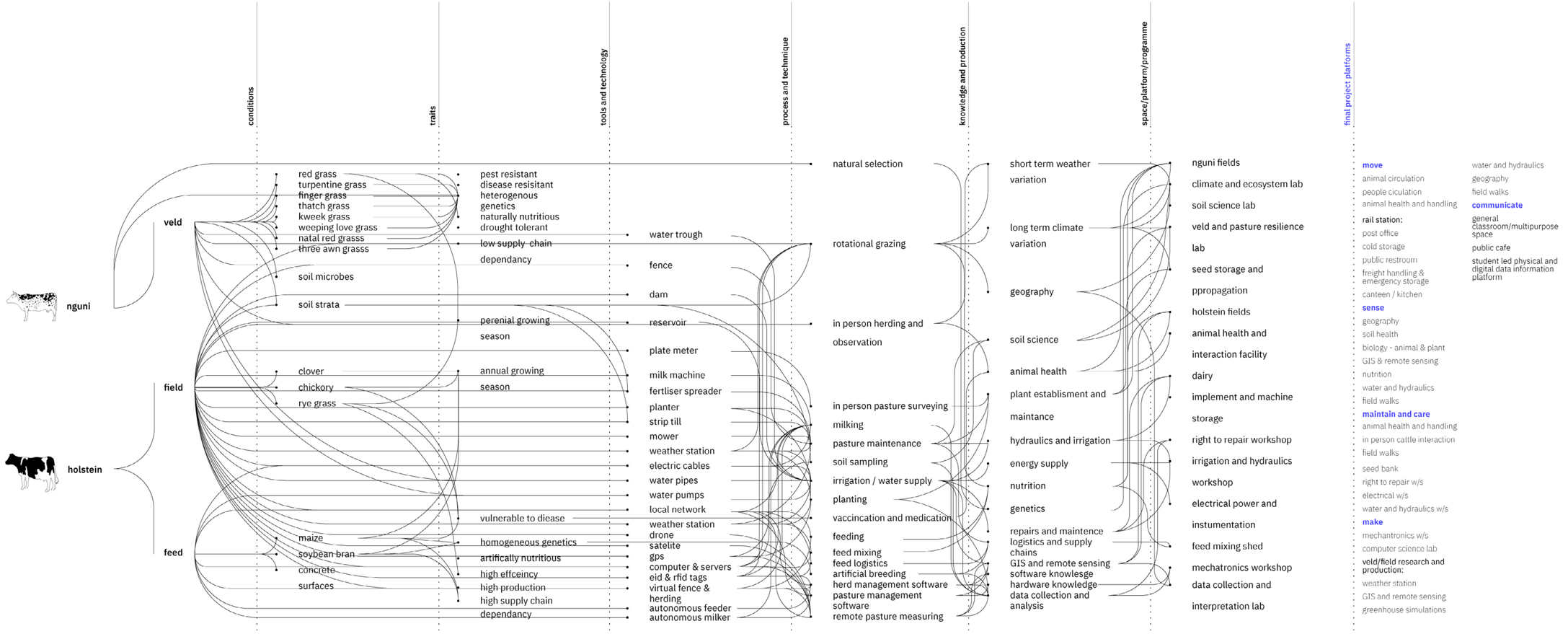
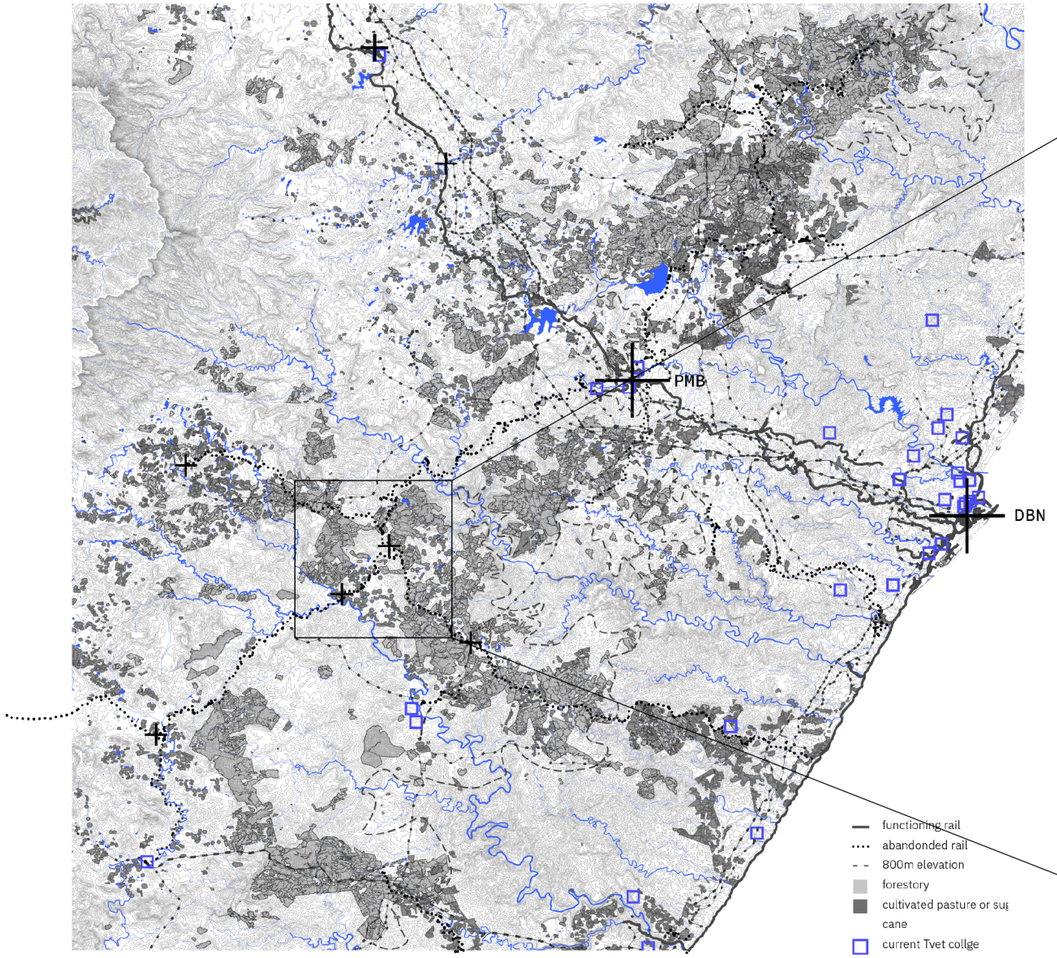
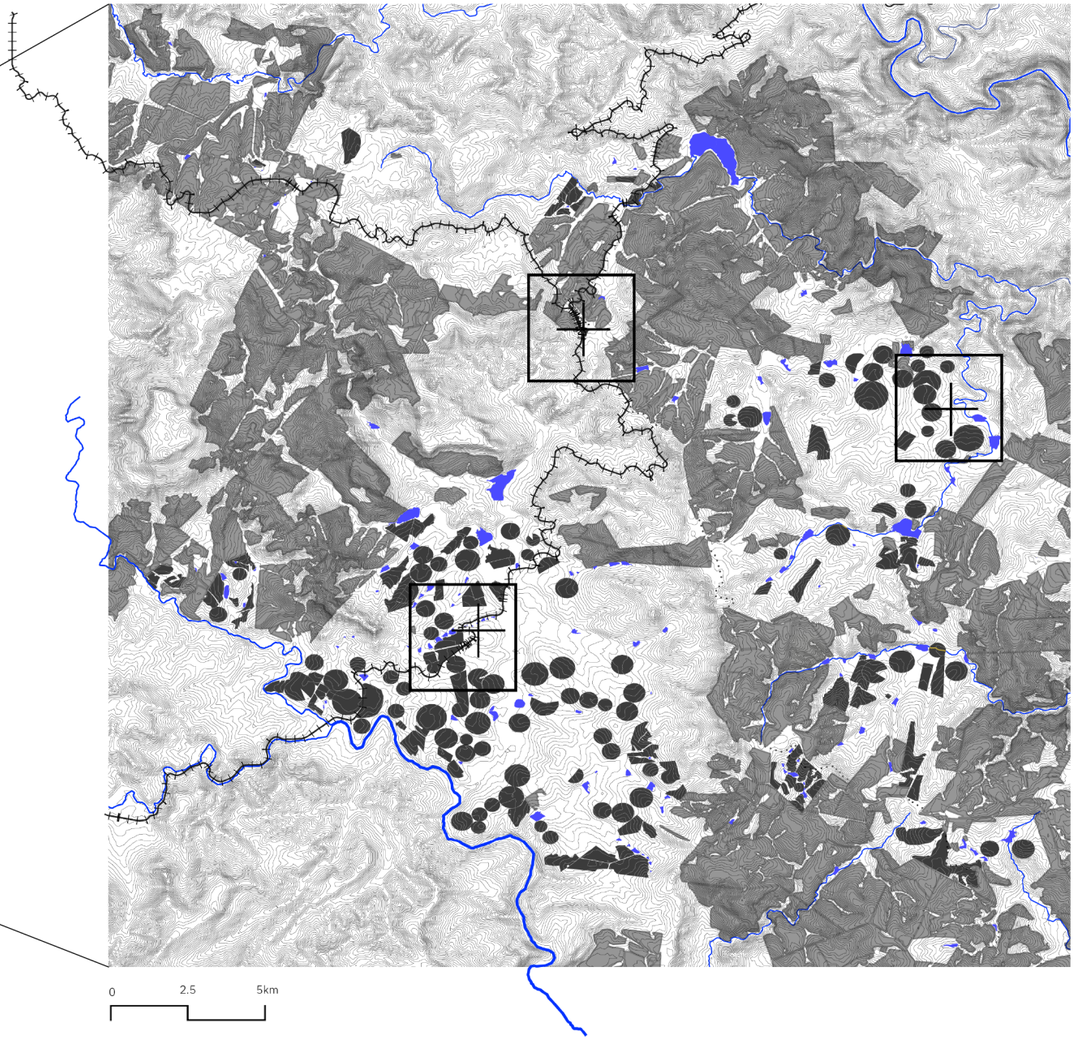
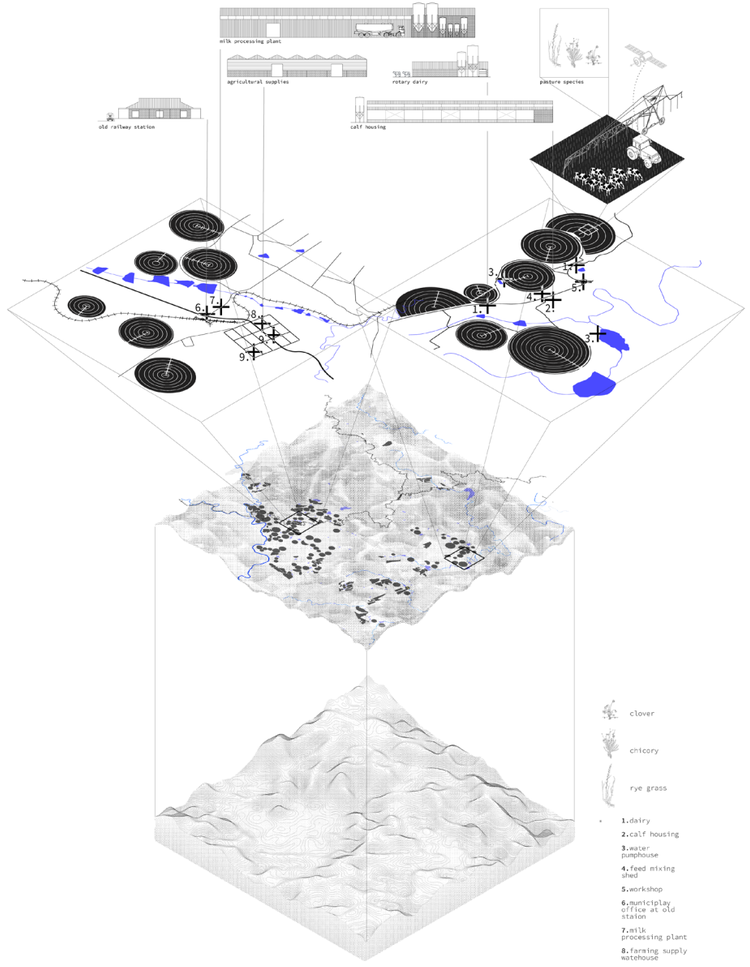


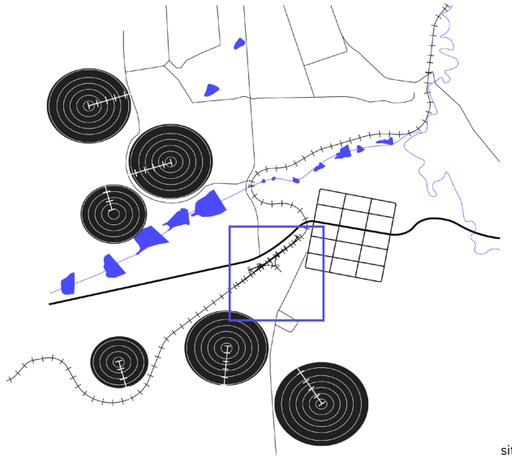
figure 4.1
tracing the spectrum represented by the Nguni and Holstein


PMB
DBN
functioning rail
abandonded rail
800m elevation
forestory
cultivated pasture or sug
cane
current Tvet collge
0
20
40km

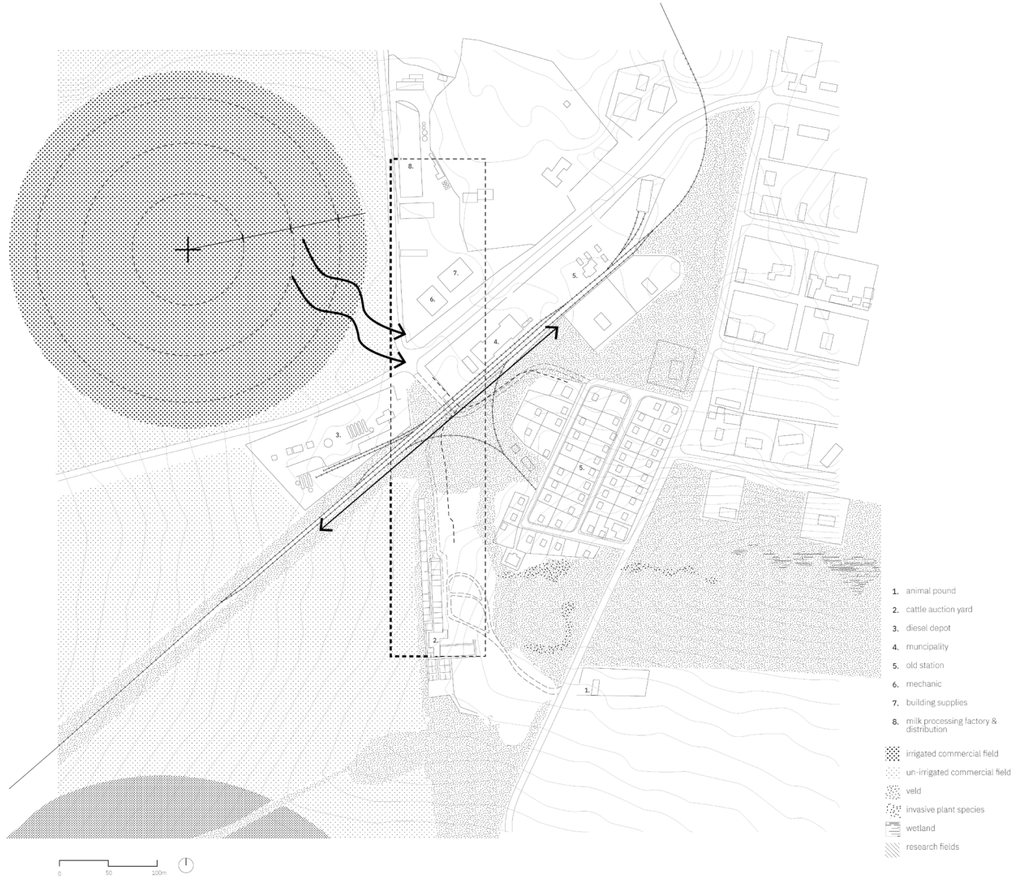

0
2.5
5km
water
lifted narrow gauge line
cape gauge line
irrigated pasture
forestry

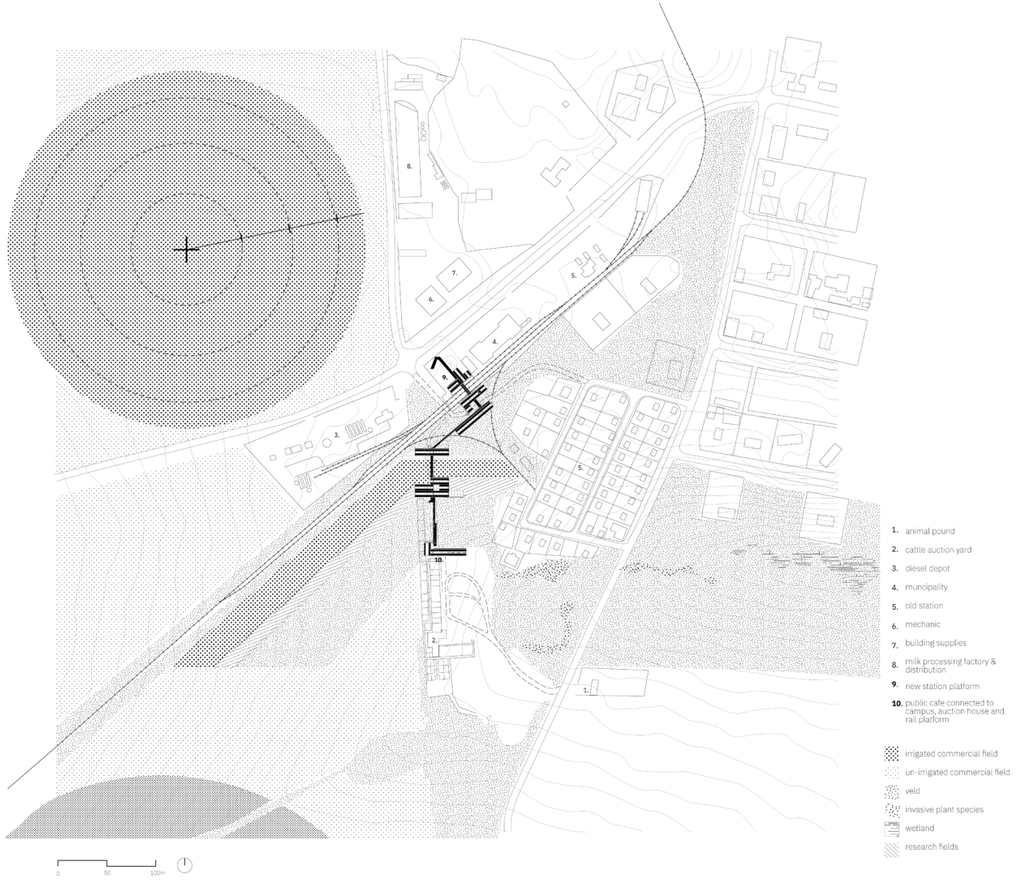


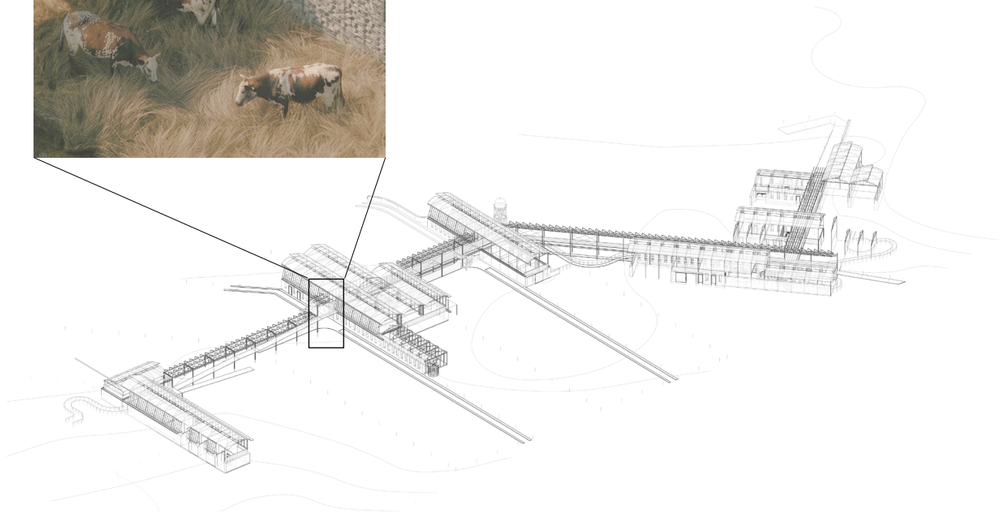
multi scalar systems
commercial dairy operates through multiple scales, from topography and climate systems through to the scale or single building or cow

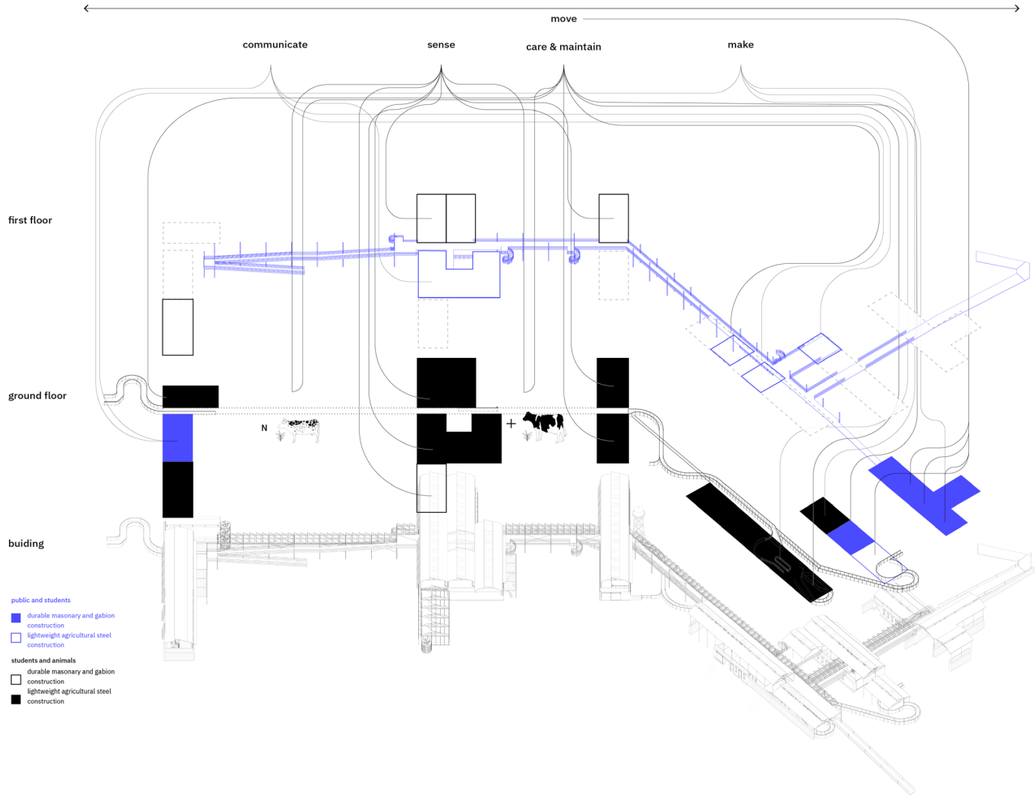


site selection


1. animal pound
2. cattle auction yard
3. diesel depot
4. muncipality
5. old station
6. mechanic
7. building supplies
8. milk processing factory & distribution
irrigated commercial field
un-irrigated commercial field
veld
invasive plant species
wetland
research fields
0
50
100m


1. animal pound
2. cattle auction yard
3. diesel depot
4. muncipality
5. old station
6. mechanic
7. building supplies
8. milk processing factory & distribution
9. new station platform
10. public cafe connected to campus, auction house and rail platform
irrigated commercial field
un-irrigated commercial field
veld
invasive plant species
wetland
research fields
0
50
100m

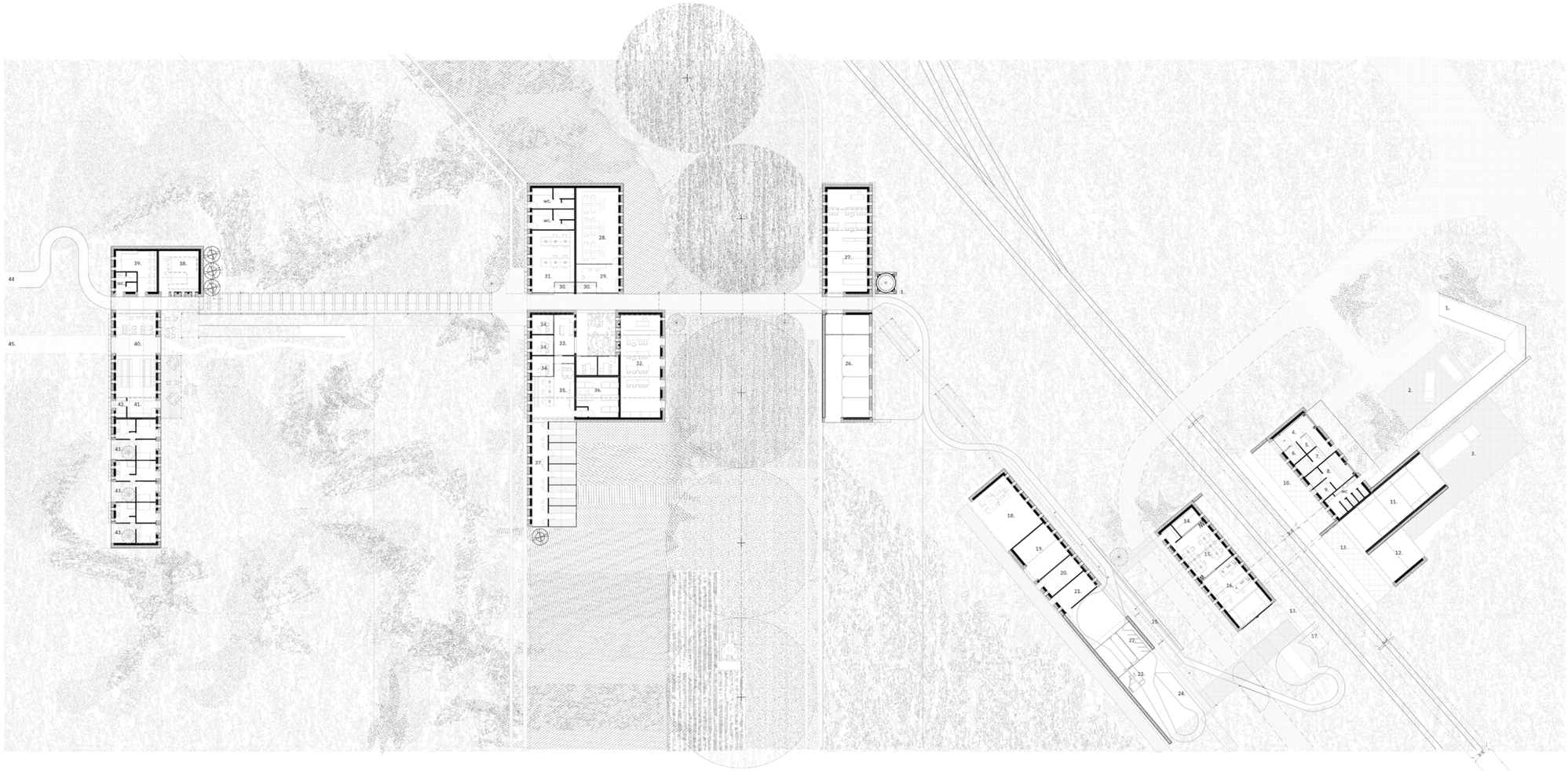



move
communicate
sense
care & maintain
make
first floor
ground floor
buiding
N
public and students
durable masonary and gabion construction
lightweight agricultural steel construction
students and animals
durable masonary and gabion construction
lightweight agricultural steel construction

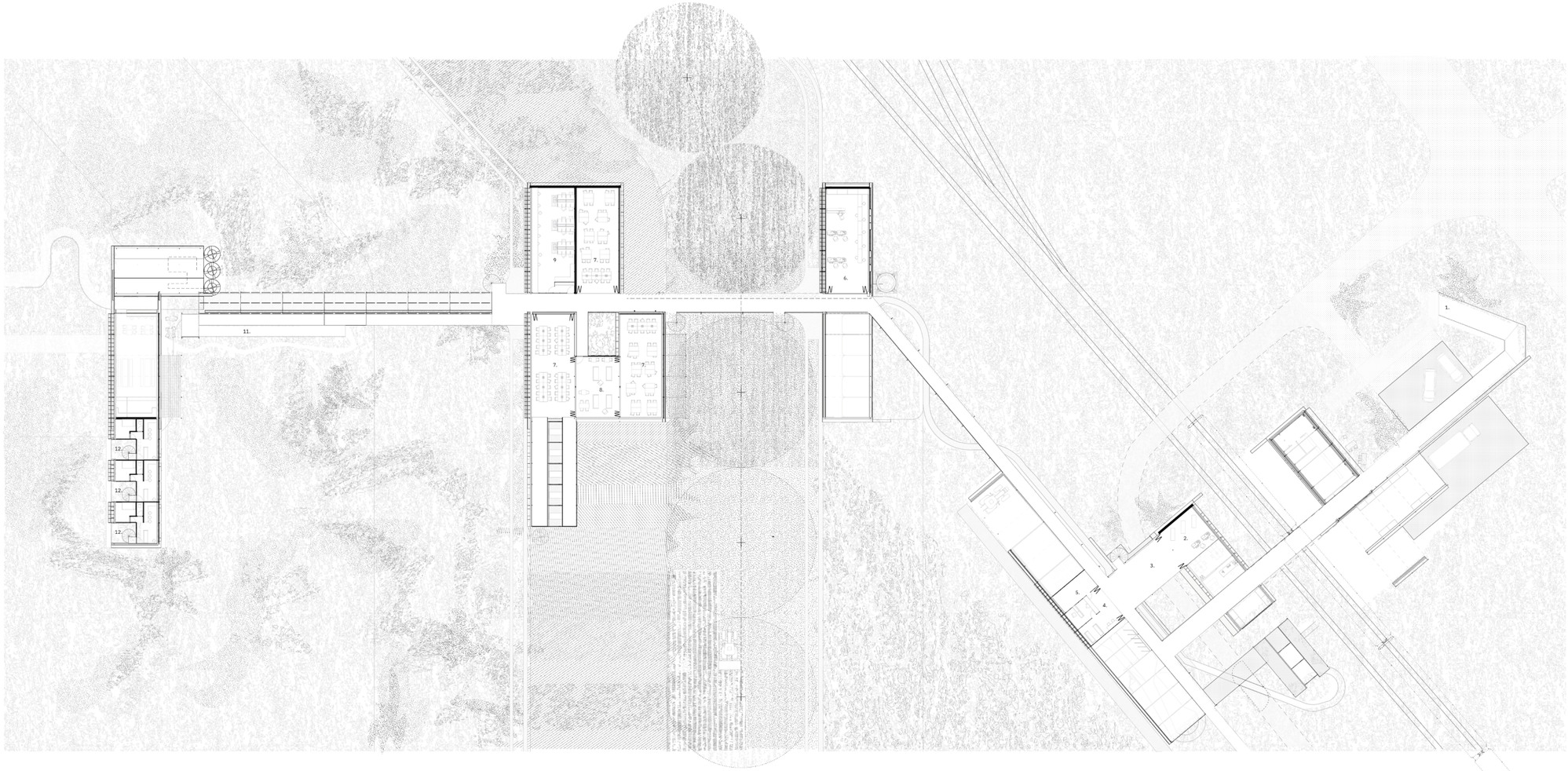
ground floor

1. entrance ramp
2. public parking
3. freight & logistics parking
4. station concourse
5. infomation desk
6. office
7. small food kiosk
8. post office
9. cold storage
10. passanger and small freight platform
11. freight and emergency storage
12. small scale non crete brick manufacturing
13. freight platform
14. equipment storage
15. mechatronics workshop
16. right to repair workshop
17. cattle platform
18. machine and implement storage
19. feed mixing
20. battery storage
21. dairy office
22. swing over dairy
23. robot milker
24. cattle health and handling
25. lowered cattle walkway and protective wall
26. calf housing
27. geography
28. soil science lab
29. soil prep
30. clean room
31. animal and plant biologoy
32. computer science
33. lobby and kitchenette
34. offices
35. climate resilience lab
36. seed bank
37. experimental greenhouses
38. pump house and hydraulics lab
39. electrical power and instrumentation workshop
40. public cafe
41. kitchen
42. kitchen store
43. student accommodation cluster
44. cattle path to auction house
45. public path to auction house

0 6 12m



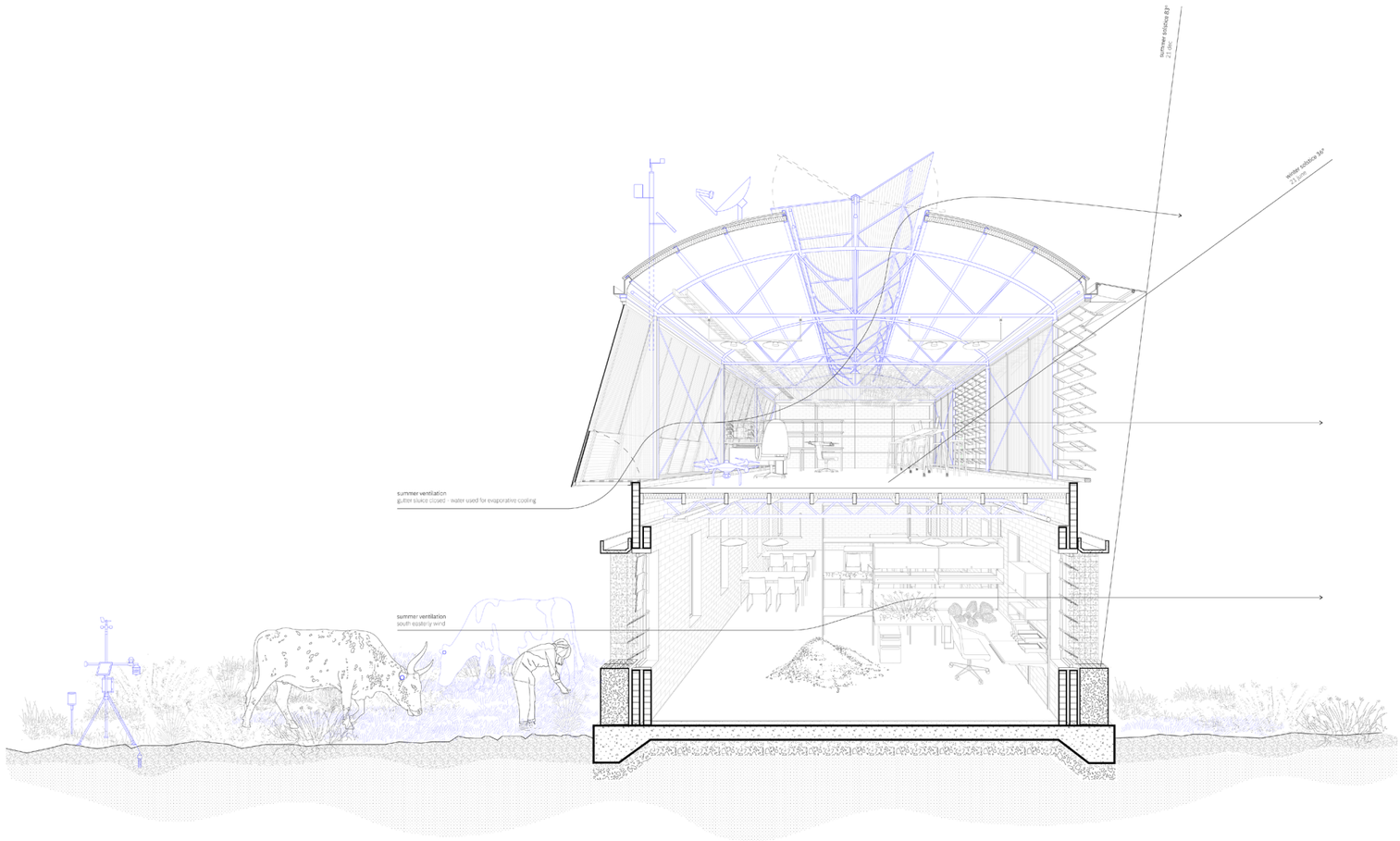
first floor



1. entrance ramp
2. gathering/meeting platform/plaze
3. student led physical and digital data/information platform
4. reception, offices and infomation
5. utilities and servers
6. remote sense lab
7. flexible 'home' class room
8. flexibke relaxation space
9. generc muiltpturpose lab
10. ramp to veld and cafe
11. student accomdation cluster

0 6 12m

section details



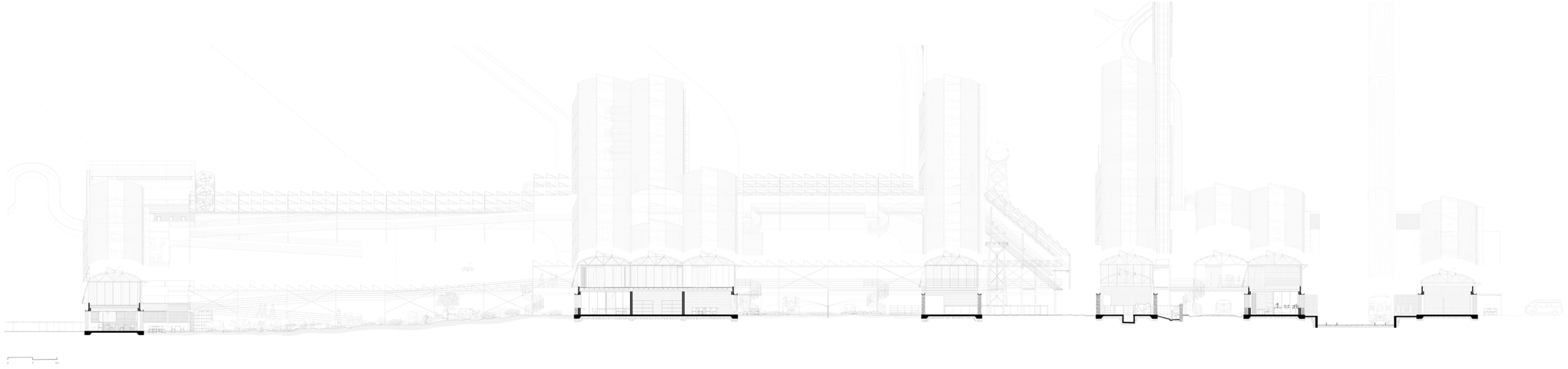
"Real life consists of the tensions produced by the incompatibility of opposites, each of which is needed" (Schumacher, 1973:89)

remote sense lab
summer scenario

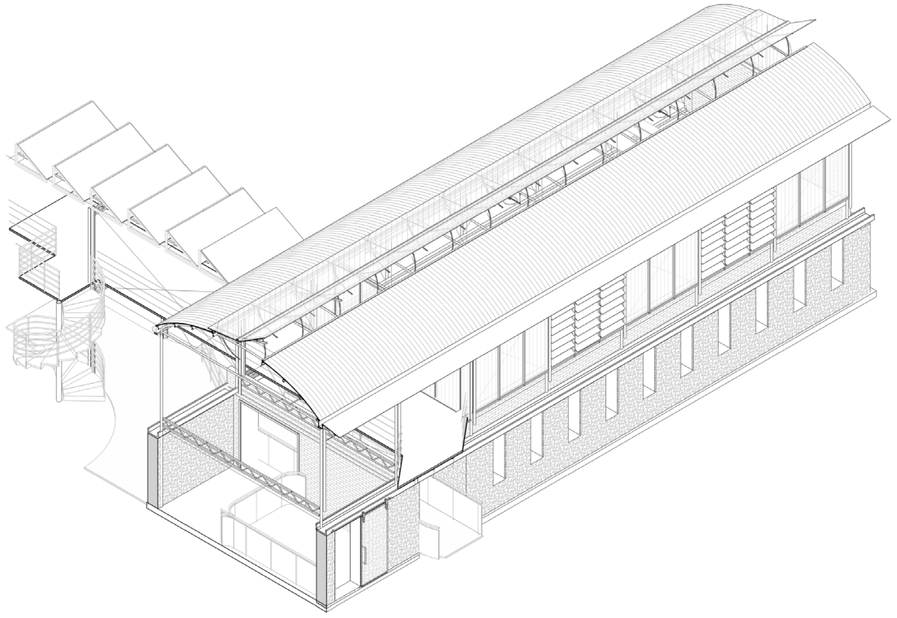
remote sense lab
winter scenario

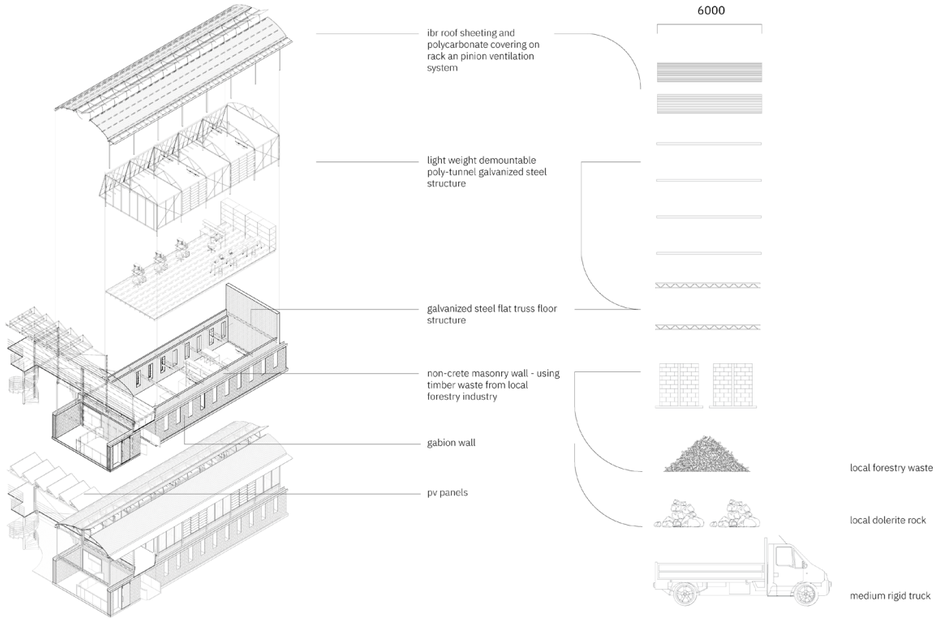
summer/winter

section and roof projection



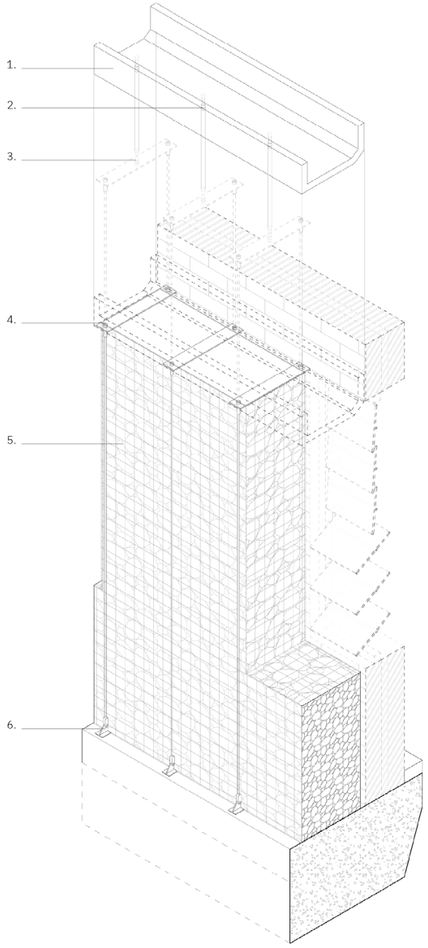
building technique





ground floor wall detail

1. precast concrete gutter
2. precast holes for threaded bar
3. galvanized steel flat bar bolted to gutter. threaded rod fixed in place with a nut on eaither side of flat bar, then gutter placed on top with nut and washer
4. tension cable connected to galniced steel flat bar
5. 400mm thick gabion baskets, each basket unit should have a wire internal windlass bracing tie. lacing wire or c rings to be uused on all corners
6. tension cable anchored to concrete floor slab



heterogeneous constructions

5.

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