

CHAPTER

01

INTRODUCTION



Figure 1.1: Children of Melusi collecting building materials in the active street (Zorn 2021).

Complex landscapes such as informal settlements ask for a shift in the mainstream architectural practices. The author of the mini dissertation aims to investigate the design approach when dealing with layered complexities on site such as informal settlements situated on post-industrial abandoned landscapes. Informal settlements exist most of the time on vacant land and inadequate land for development such as abandoned post-industrial landscapes, wetlands, floodplains, and near rivers which are high-risk areas and contain environmental disadvantages (Adegun 2016:16). This mini dissertation aims to address the complexity of both the socio and ecological needs of a vulnerable community because of the connection and the relationship of the community with the natural ecosystems which can be problematic and cause hazards, but it also shows immense potential for sustainable solutions towards community independence and self-sufficiency (Adegun 2016:17).

“The relationship between human settlements and the natural environment or ecological system is complex, iterative and continually changing” - (Department of Forestry Fisheries and the Environment, n.d.)

RESPONSE: CATALYTIC NEXUS MEDIATOR

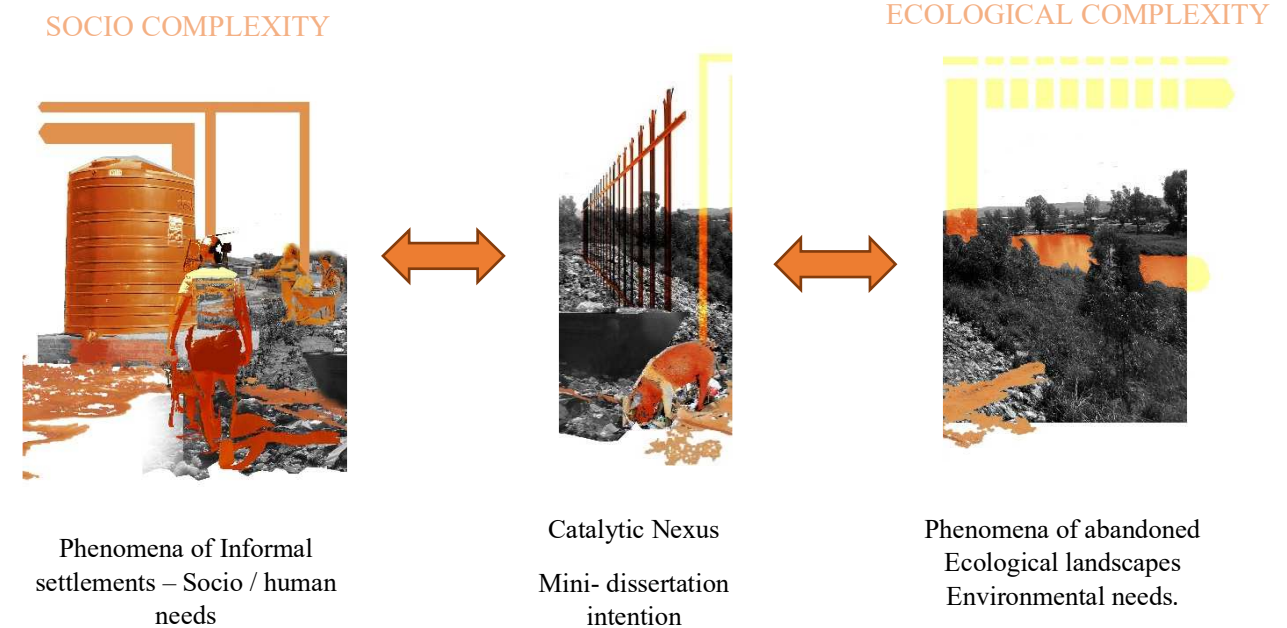


Figure 1.2: Intention of the mini dissertation (Author 2021).

MAIN PROBLEM

PHENOMENA OF INFORMAL SETTLEMENTS

[complexity of socio needs]

Since independence in 1994, informal settlements in urban areas became a regular phenomenon with an exponential growth pattern and a lack of effective, proactive town planning (Pienaar 2002:5). This phenomenon is described by JM Pienaar (2002:5) as an *Urban Crisis*. Informal settlements in South Africa are the result of spatial injustice and an imbalanced political atmosphere. South Africa's cities will have to adjust to the current informality introduced organically. Normally informal settlements do not have any services available due to the authorities that generally refuse to provide them, as a result preventing the possibility of further expansion (Pienaar 2002:5). Through assessing the failures and shortfalls of previous upgrading schemes, the conclusion can be made that South Africa has not yet found a viable solution to the injustices in our urban contexts (Cirolia et al 2016). Upgrading informal settlements often implies a project-driven approach that has led to the downfall of informal upgrading schemes (Hamdi 2010). The main constraint experienced by the Government is how to upgrade informal settlements and not be financially obligated to sustain these interventions after practical completion. This mini dissertation will aim to find design solutions ensuring individuals and living spaces of continual growth towards co-evolution after practical completion (Jack 2014) and simultaneously improving the social and environmental needs of the landscape.

URBAN PROBLEM

1

PHENOMENA OF ABANDONED OR ECOLOGICAL LANDSCAPES

[complexity of ecological needs]

Informal settlements tend to develop on open, abandoned land or sometimes on land which consists of high ecological value where development is not allowed to preserve and protect these ecosystems or exists on least desirable or environmentally compromised areas such as flood lines, on dolomite land and next to mine dumps. These sites are often the only available sites in well-located or urban areas (*Department of Forestry Fisheries and the Environment, n.d*). These human settlements' interaction with the environment causes more harm to the environment due to the excessive extraction of non-renewable natural resources (*Department of Forestry Fisheries and the Environment, n.d*).

2

CURRENT ARCHITECTURAL METHOD

Architects practicing in complex spatial problems tend to argue following a linear problem-solving approach, entering the challenge with preconceived solutions (Hamdi, 2010). Architecture is not just human shelter but space, which should cater for the complex form of human expression and spirituality which can't be analysed in a linear approach (Maslow, 1943). The human is a complex being with fluctuating needs and by understanding the layered complexity that one can no longer deal with spatial problems in isolation (Max-Neef 1991).

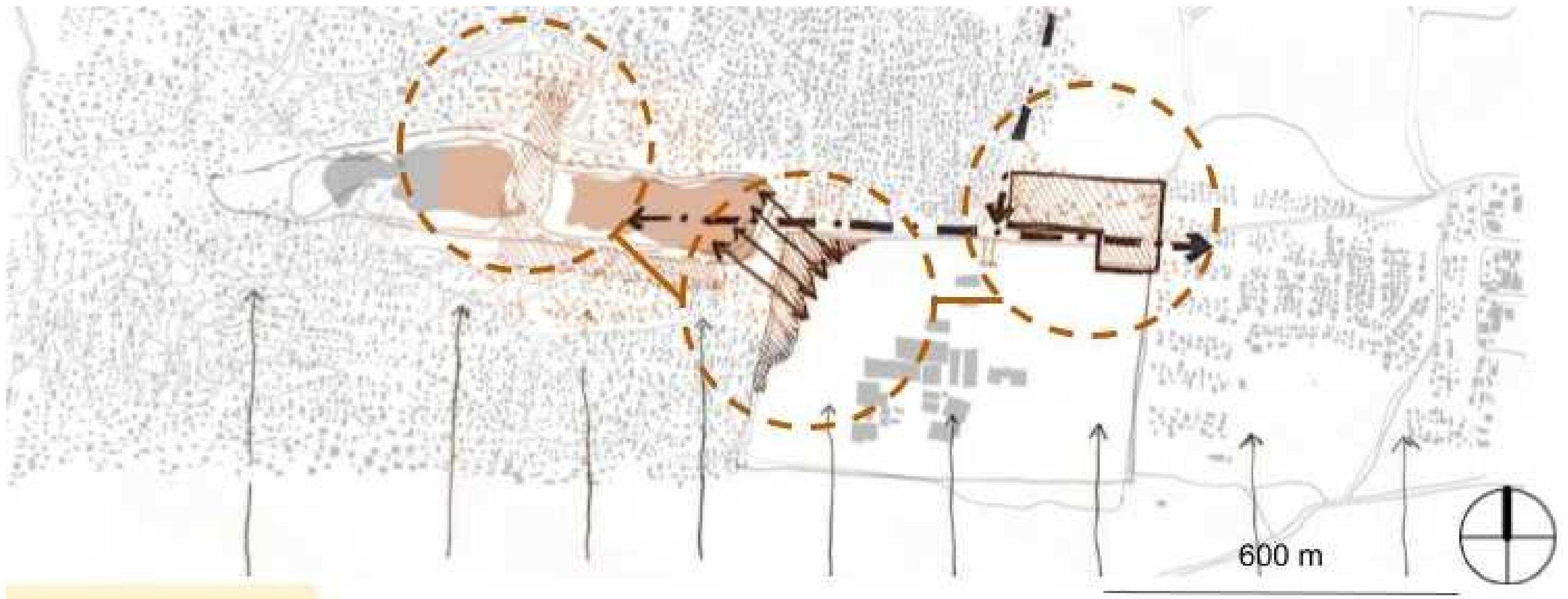


Figure 1.3: Site map showing proposed multiple strange attractors (Author 2021).

NORMATIVE POSITION

The proposed process of working in layered complexity spaces is to facilitated upgrading on a social and ecological level to ensure the successful transference of ownership but also to ensure for co-evolution to take place. Snowden (2011) suggested the following method of resolving physical complex phenomena is to Probe – Sense – Respond. Snowden suggests implementing multiple small, strange attractors or catalysts within a complex space which has the possibility to create smaller connection within the strange attractors. The concept is that the inhabitants interact with the attractors organically. The ideal would be for the strange attractors to function as OODA loops (figure 3.4), sustaining themselves by allocating people tasks and responsibility to maintain a functional strange attractor through Observe, Orient, Decide and Act. The OODA loop can only be successful if there was a transference of ownership towards the community using participatory design and co-design practices. When the OODA loop phenomena is evident within a space it will organically grow through internal connections into a co-evolutionary community towards co-evolution and community self-sufficiency. This mini dissertation aims to facilitate this socio and ecological emergence.

By planting the seed of ownership, the architect opens the mind towards critical thinking and problem-solving skills which will have a sustainable effect on a community (Hamdi, 2010).

The author suggests that one should not only focus on one need in isolation but that a gradual intervention process is necessary for a project to be successful in addressing both the ecological and the social needs illustrated in figure 1.5.

In Chapter four a framework (figure 1.4) developed to address both the socio and ecological aspects in informal settlements upgrading projects is discussed in detail.

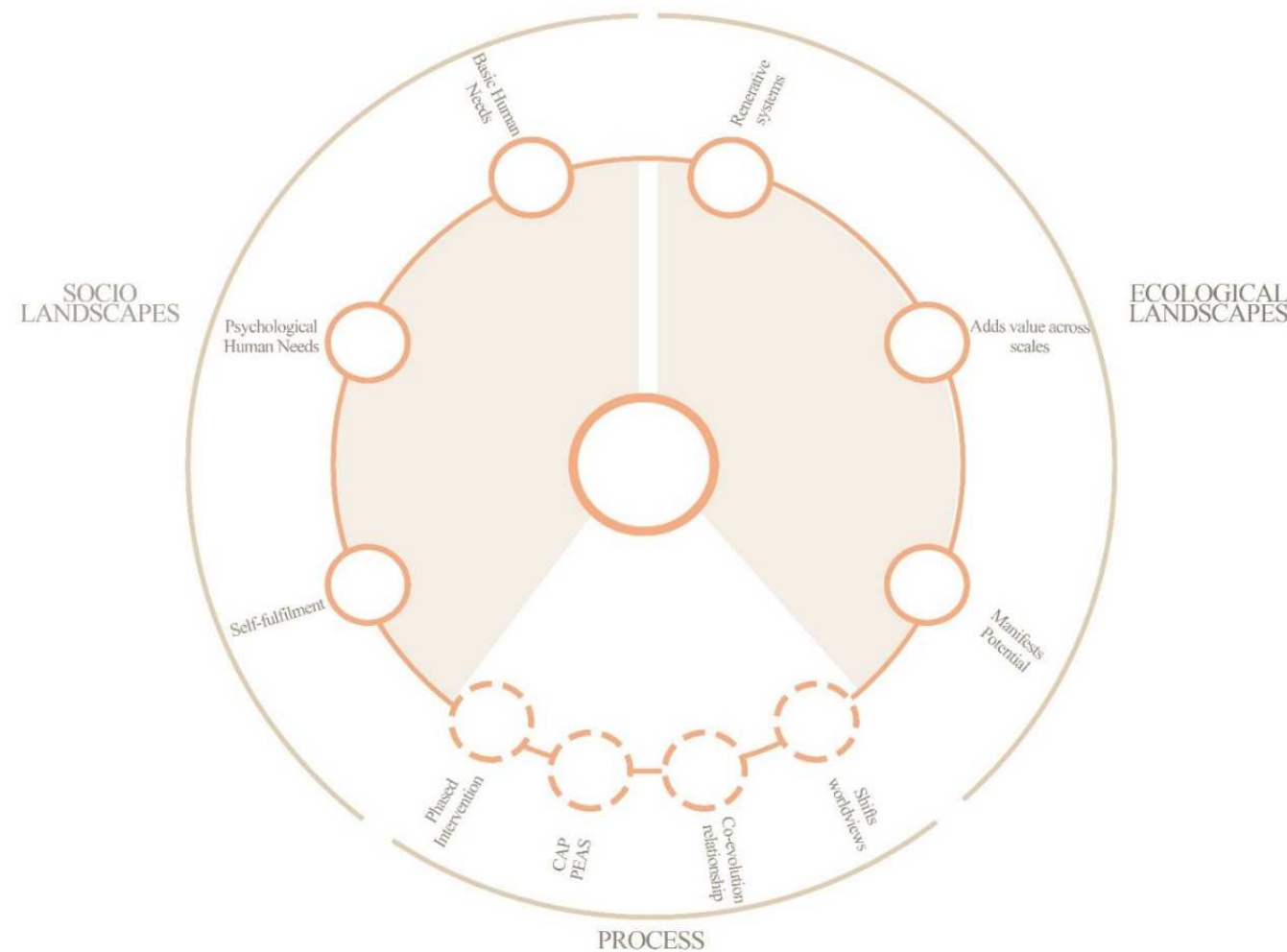


Figure 1.4: Developed framework (Author 2021).

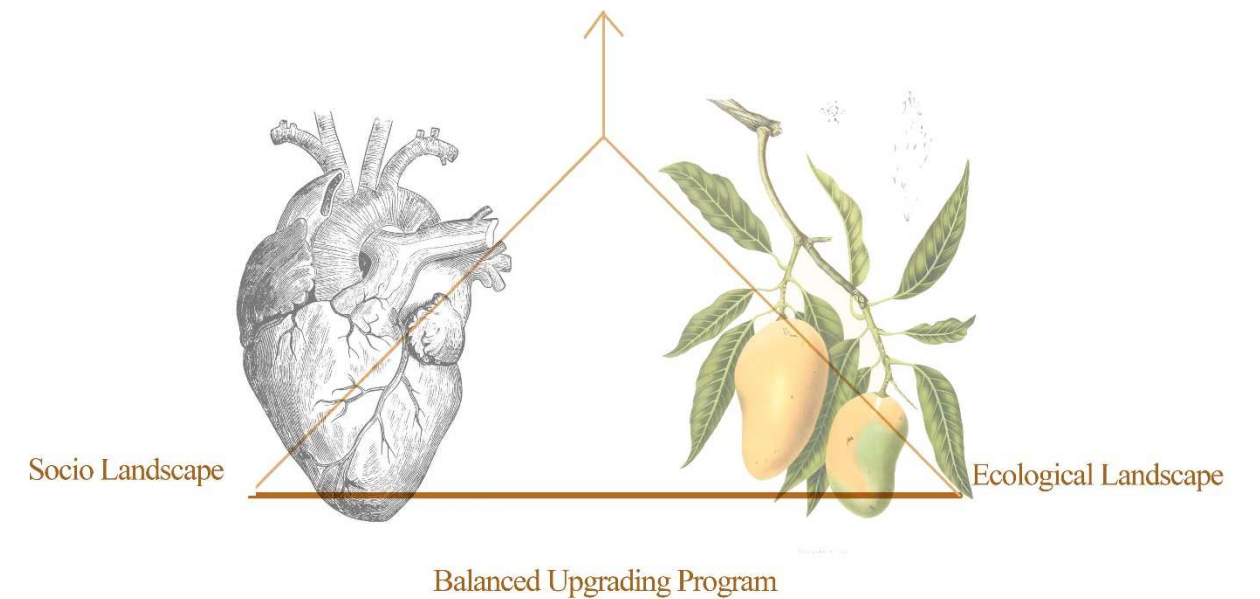


Figure 1.5: Illustrates the project intention which is to gain co-evolution towards self-efficiency (Author 2021).

PROPOSED SITE

SELECTED SITE

[Consists of both socio and ecological complexity]

The socio and ecological issues mentioned above are prominent in Melusi informal settlement and therefore the chosen site for this project. Melusi is an informal settlement West of Pretoria CBD near the Daspoort Tunnel (figure 1.6). The community shows exponential growth from 2008-2021 as indicated in figure 1.12. The land has been vacant for years before Melusi was established. Melusi consists out of three quarry holes and a natural wetland which made it difficult in the past for development to take place.

MACRO CONTEXT

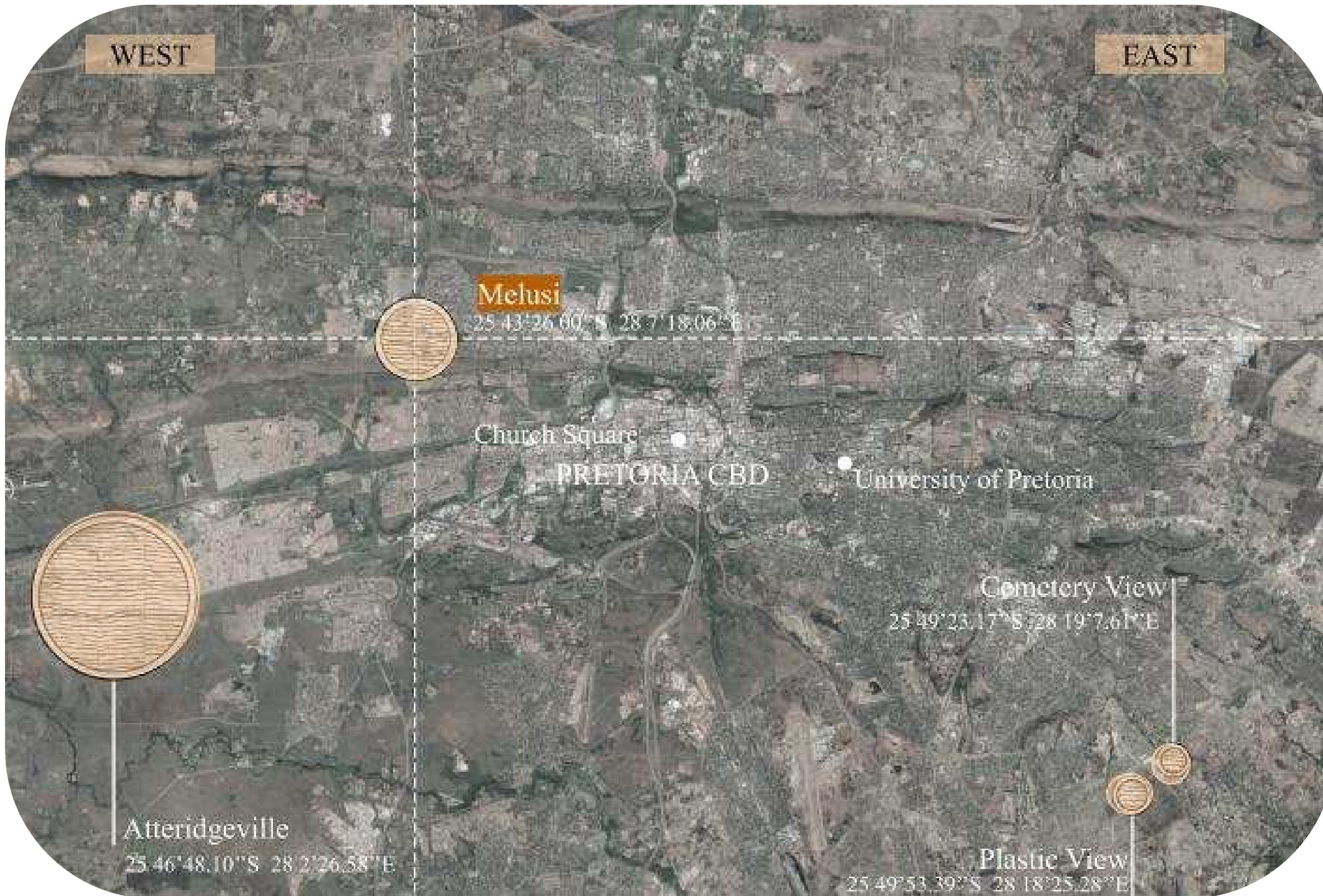


Figure 1.6: Broader Context of Melusi. Original Orthophoto obtained from Google Earth (Climate adaptation studio 2020).

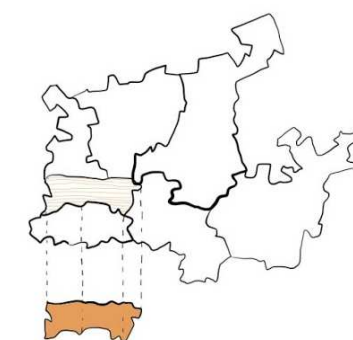
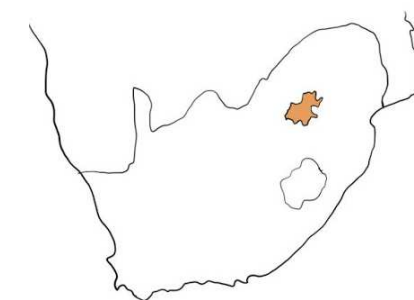


Figure 1.7: Melusi is situated in the City of Tshwane district in Gauteng province (Author 2021).

CHOSEN SITE

Quarry hole steep slope



Figure 1.8 & 1.9: Chosen site for intervention situated on the slope of the main quarry hole (Author 2021).



Figure 1.10: Selected site for the intervention- Repurpose the slope of the quarry hole making the edge a safer area (Author 2021).



Figure 1.11: Highlighted is the bridging island which will also be intervened on creating a link and bridge between the two parts of the community (Author 2021).

MELUSI GROWTH

Quarry hole steep slope

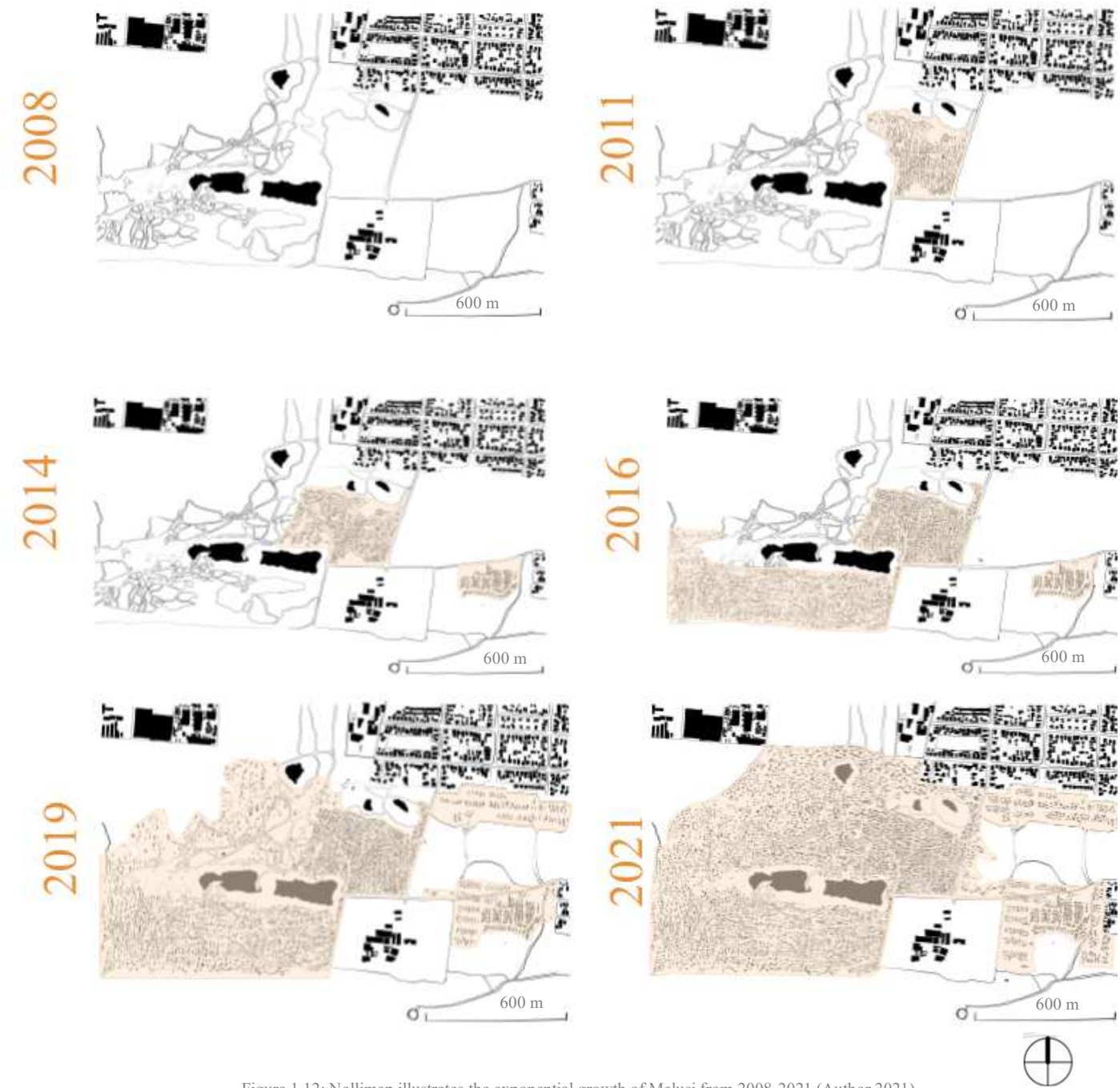


Figure 1.12: Nollimap illustrates the exponential growth of Melusi from 2008-2021 (Author 2021).



Figure 1.13: Site photo of the [Mohlalele Township](#) for safer pedestrian routes (Zorn 2021).

MELUSI SITE HISTORY

Because of the brief history documented about the site, the Author reached out to Rehan Opperman, which works at the Council for Geoscience on 19 August 2021 via an email.

According to the mineral deposit database Opperman (2021), mentioned that the site was mined for sand and clay of which the sand mining activities were already in progress at least in the year 1930. According to Opperman the Groenkloof Brick Works belonging to JJ Kirkness established a brick making plant in the late 1940's or early 1950's at the site of Melusi. Shortly before the Groenkloof plant shut down in 1950's the suburb "*Kirkney*" (name of a town in Scotland) next to the site was chosen as tribute to JJ Kirkness as the Scottish ancestry (Opperman 2021).

The site is underlain by the shales of the Silverton Formation. Weathering of the northwards dipping quartzites of the Daspoort Formation resulted in the formation and northwards transportation of the sand deposits. The sand deposits would generally be expected to overlie the shales. On the older aerial photographs, it seems as if the concentration of sand occurred from a poorly drained East-West channel (Opperman 2021). The sand deposits are normally not very thick and suitable sand would have been stripped from extensive areas. According to Opperman there was not significant rehabilitation done on the site after excavations took place. It is expected for some areas to have little to no topsoil, which has negative implications such as soil fertility and drainage challenges (Opperman 2021).

By analysing the old aerial photographs Opperman made the following conclusions regarding the Quarry holes. The quarry holes are related to clay mining activities. It seems as if the weathered shales were mined and according to Opperman do not exceed 5-10 m in depth. The conclusions by Rehan Opperman are confirmed by Piet Vosloo (2018:46) as he mentions that there are numerous stone, clay and gravel quarries situate in and around the City of Tshwane region especially close to the ridges in Gauteng. There are around 12 potential quarry sites on the Magaliesberg and Daspoort ridges alone (Vosloo 2018:46).

1939

AERIAL PHOTOGRAPH

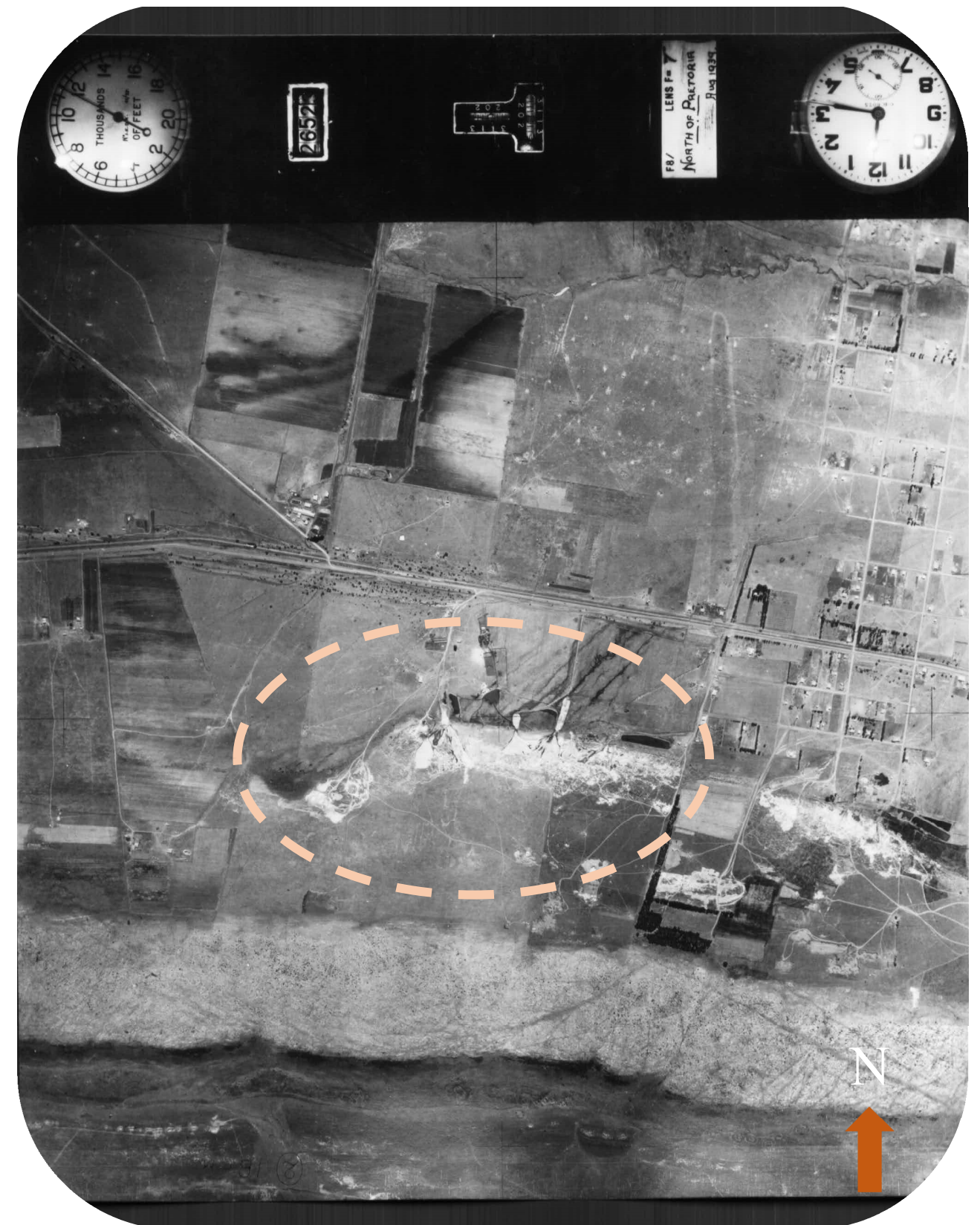


Figure 1.14: Aerial photograph of Melusi site in 1939. Visible is only sand mine present (Opperman 2021).

1947

AERIAL PHOTOGRAPH

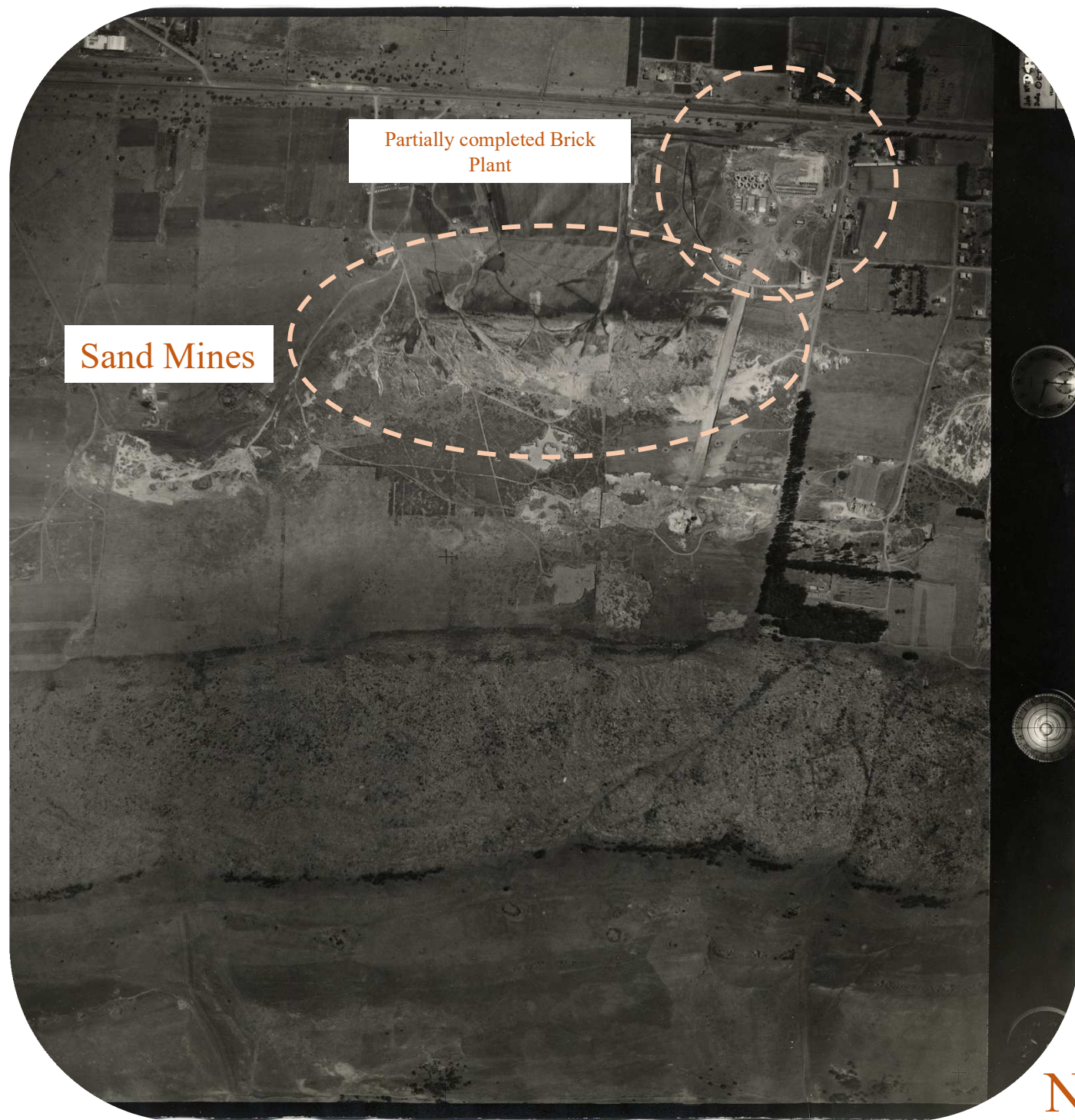


Figure 1.15: Aerial photograph of Melusi site in 1947. Indicated is the partially completed brick plant visible near Van Der Hoffweg (Opperman 2021).



1980

AERIAL PHOTOGRAPH



Figure 1.16: Aerial photograph of Melusi in 1980. Indicated is the three quarry holes currently situated in Melusi settlement (Opperman 2021).



ARCHITECTURAL PROBLEM

CURRENT QUARRY AND WATER REOURCE AS BOUNDARY AND EXISTS IN ISOLATION

[Signs of Community have physical visual boundaries towards the Quarry]

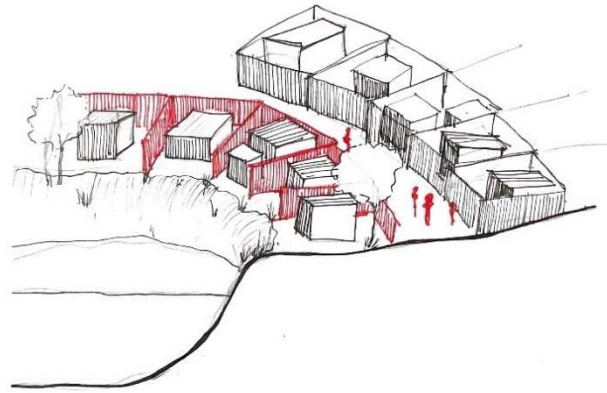


Figure 1.17: Illustrates the visual boundary and phenomena one where the Melusi community resides adjacent to the Quarry by using the quarry as a fourth boundary (Author 2021).

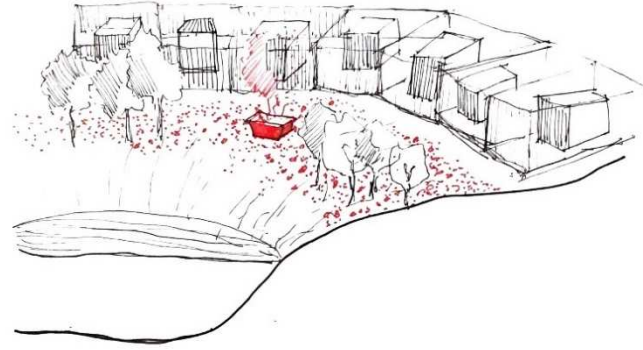


Figure 1.18: Illustrates the visual boundary and phenomena two where the Melusi community uses the slope of the quarry as a dumping site (Author 2021).

Through the data collection process (interviews), it became clear that there are multiple perspectives and perceptions of the existing quarry hole. The quarry is filled with water and resulted in a hazard for the community. The COPC researchers refer to the quarry as a health and physical hazard. The residents of the Melusi use the quarry as a fence or boundary indicated in the figure 1.17-1.20. The houses and household turn their back onto the water bodies and do not have any interaction with the quarry except as a dumping site as per figure 1.21-1.22.

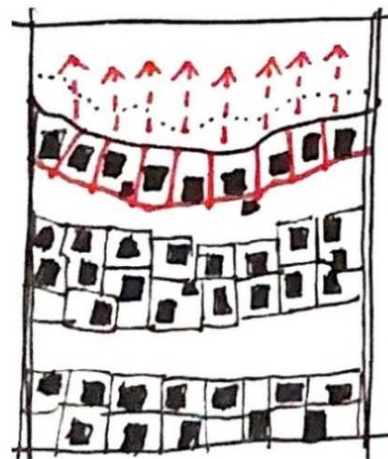


Figure 1.19: Plan view of visual phenomena one (Author 2021).

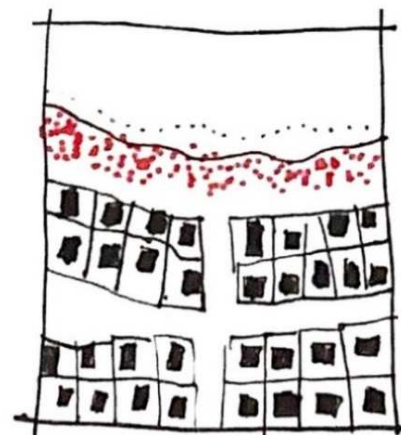


Figure 1.20: Plan view of visual phenomena two (Author 2021).



Figure 1.21: Observed Dumping sites in Melusi (Author 2021).

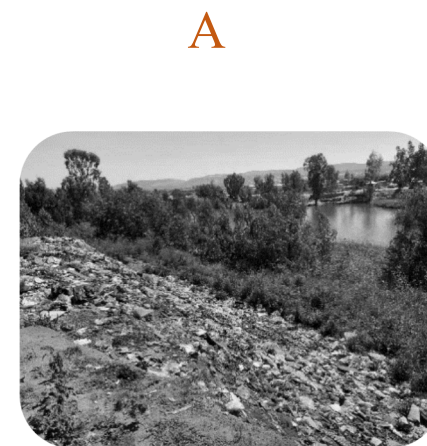


Figure 1.22: Waste on quarry edge (Author 2021).



Figure 1.23: Waste in the main street of Melusi (Zorn 2021).

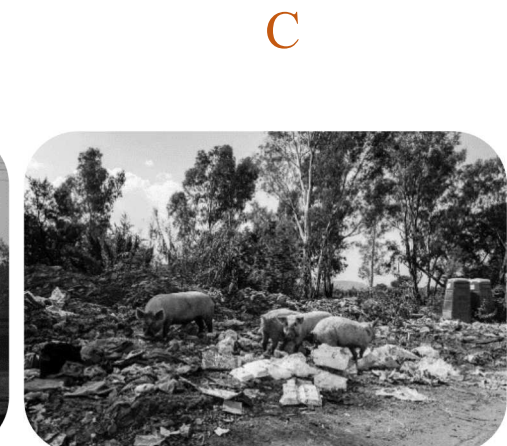


Figure 1.24: Pigs on the duping sites at the natural wetland (Zorn 2021).

[Signs of Community have phycological invisible boundary towards the quarry]

The children gave us a glimpse of their fear for the “Dam” as they referred to the quarry in one of the water workshops we conducted on-site. The children believe that a monster exists in the quarry and to never goes near the water body. This mythical creature and story might be a safety mechanism the adults implemented to keep the children safe.

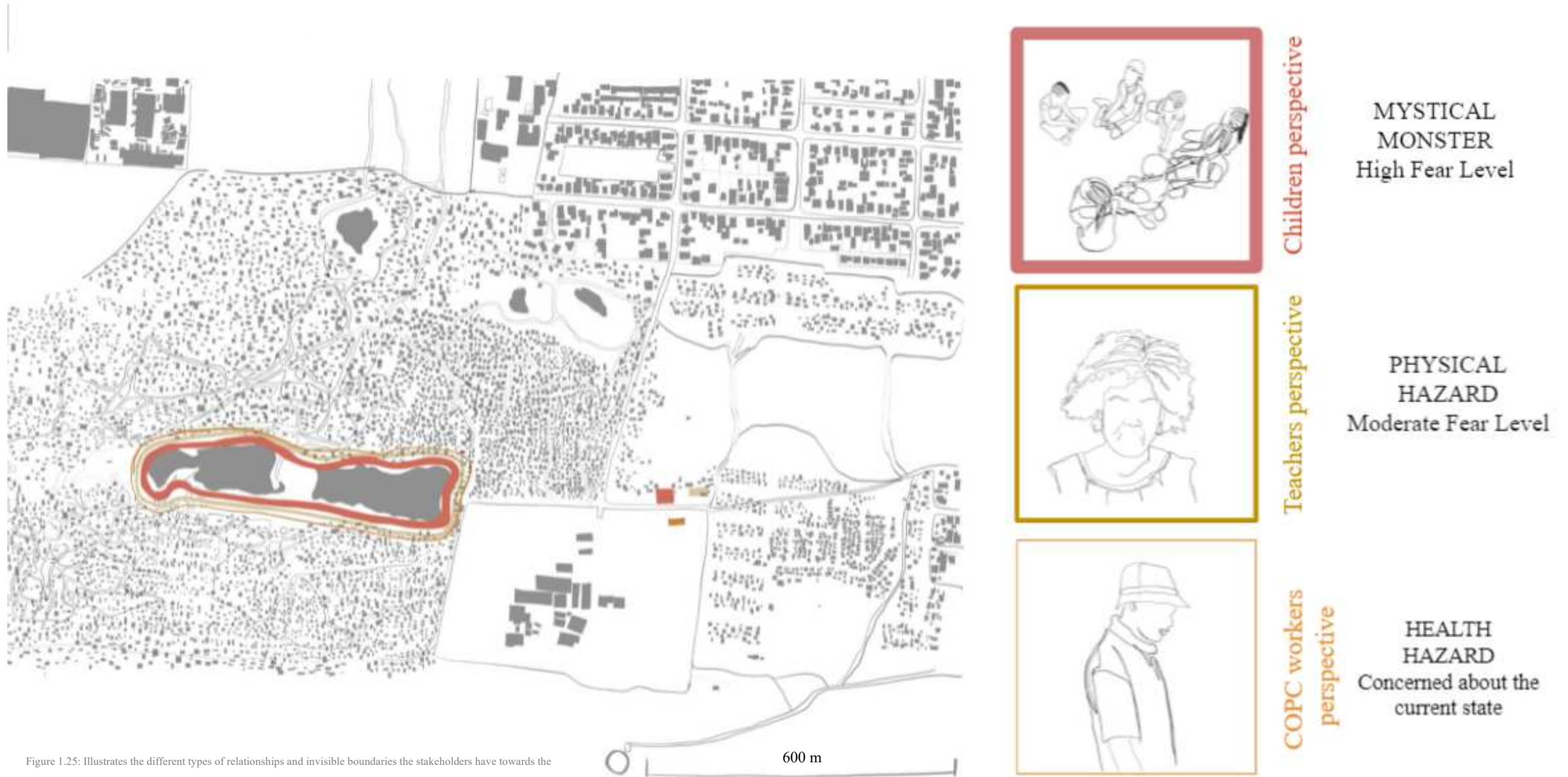


Figure 1.25: Illustrates the different types of relationships and invisible boundaries the stakeholders have towards the quarry (Author 2021).

METHODOLOGY

On Site Data Collection Methodology

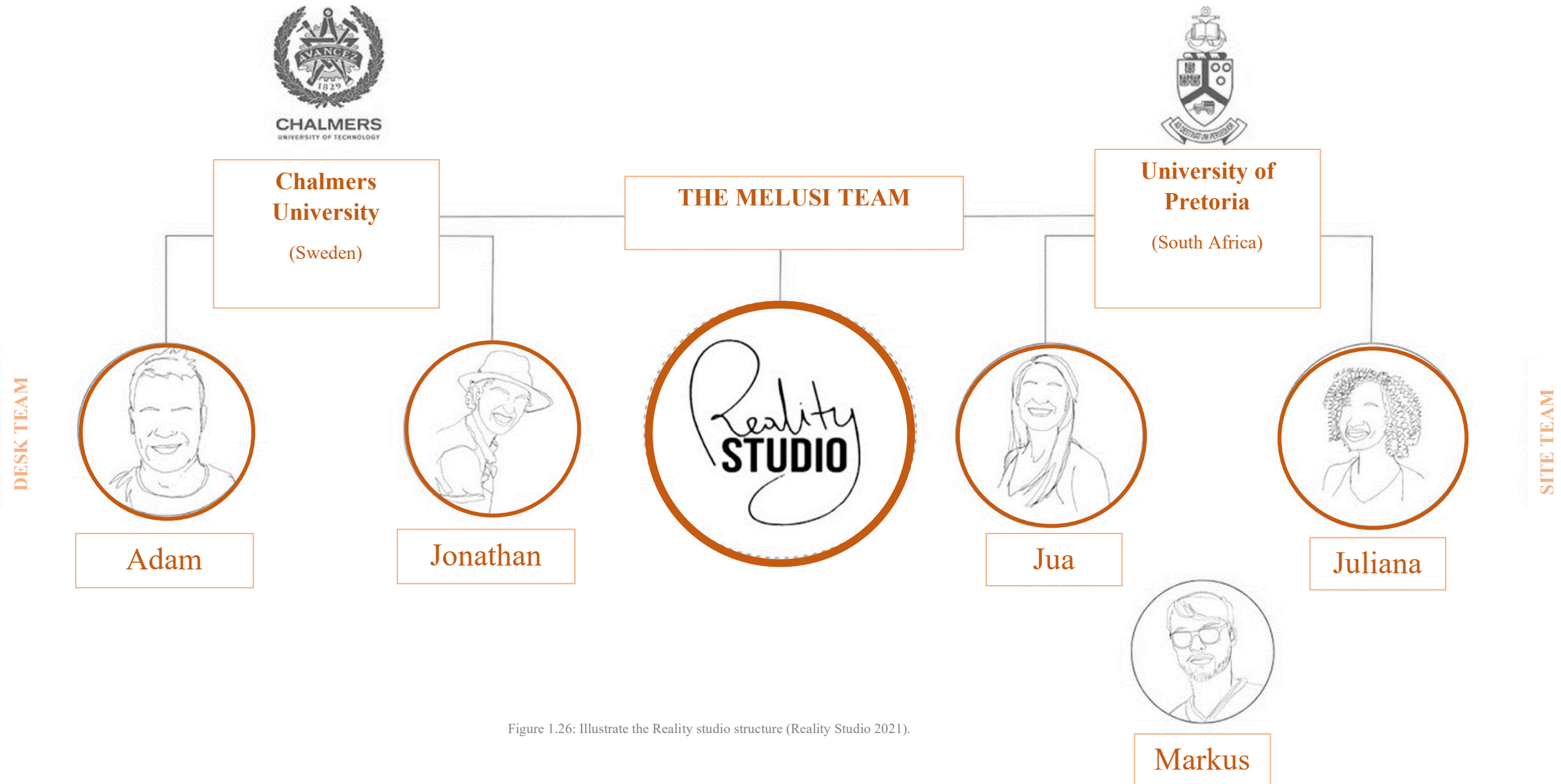


Figure 1.26: Illustrate the Reality studio structure (Reality Studio 2021).

This mini-dissertation formed part of - *The Urban Citizen Studios: Public Interest Design in South Africa*. This Studio collaborated with international students at Chalmers University in Sweden see figure 19. The current global pandemic (Covid-19) made it possible to collaborate internationally. The goal of this studio was to conduct a rigorous data collection and site analysis process in group format. The findings of the data collection process will be used to design an urban framework with a “Now” intervention (Hamdi 2010).

The project outcome of this mini dissertation will act as the “Soon” and “Later” intervention. Nabeel Hamdi (2010) suggested in the Community Action Planning (CAP) process to have multiple interventions that follow onto each other towards the successful transference of ownership. The importance of the “Now-Soon-Later” approach towards intervention is to introduce the Melusi community to the upgrading process, improving trust and relationships between stakeholders.

FIELDWORK TIMELINE

Reality Studio



Figure 32: Illustrates the multiple methods used on site (Zorn 2021).



Figure 1.28: Mydo Youth centre sign in Melusi main street (Zorn 2021).



Figure 1.29: Illustrates the timeline and the community engagement the Reality Studio team conducted with the community (Zorn 2021).

CLIENT & USER

The Client of this project is the City of Tshwane and the Melusi community and the stakeholders identified is the following:

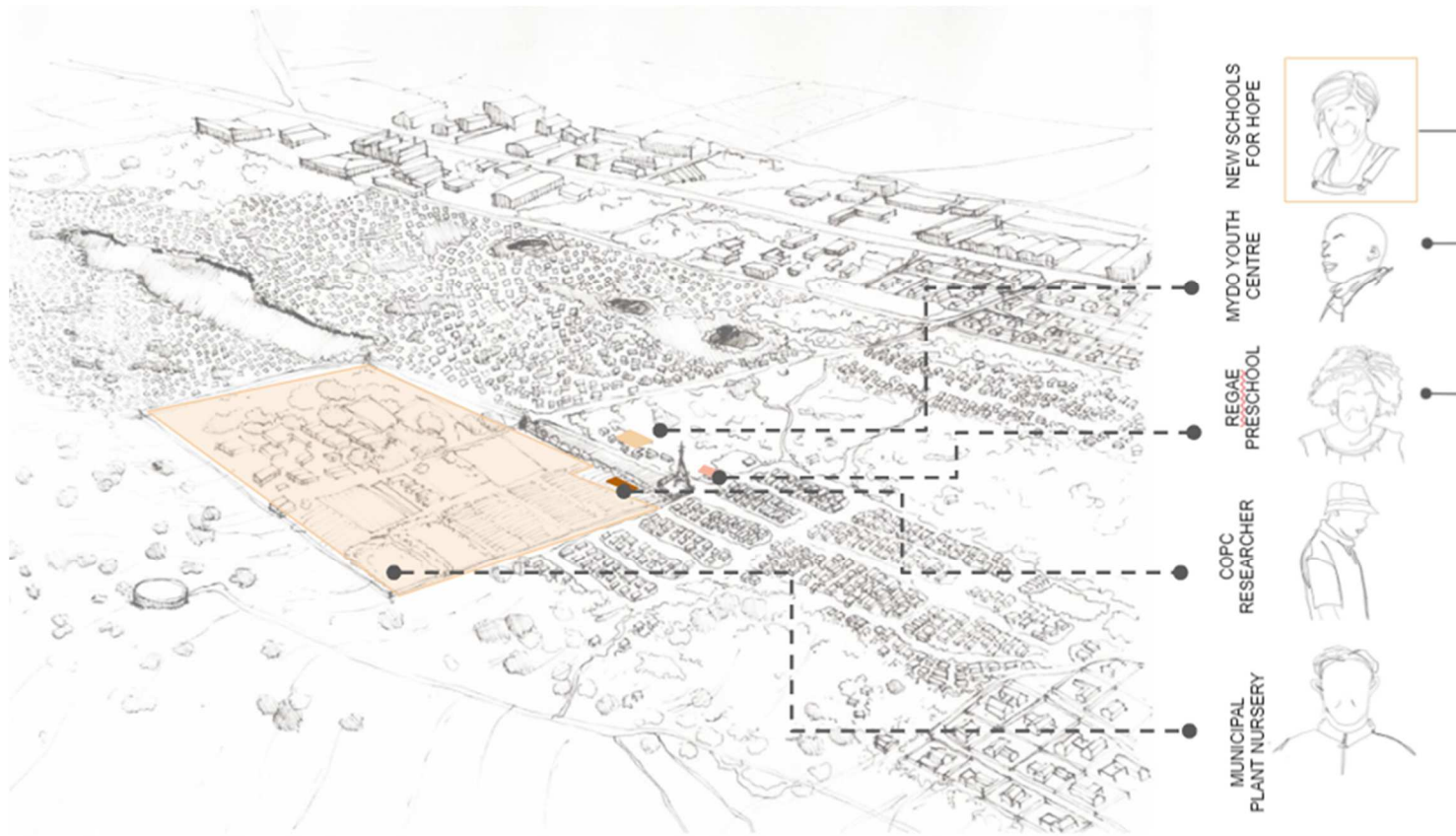


Figure 1.30: Illustrates the location of the stakeholders in Melusi (Climate adaptation studio 2020).

The Reality studio made use of the following methods to capture qualitative and quantitative data. The quantitative data were captured through transect walks where the group made use of photographs and Pic2Map to geolocate the photographs. The information was stored on a centralized Google drive. The team designed two games we played with the ECD- Regae preschool of Hope and the Mydo Youth Centre. The games were designed to be measurable to form part of the quantitative data collection. The qualitative data were captured through structured interviews and informal conversations with the stakeholders as in figure 1.31. The interviews were recorded and transcribed for analysis.

The educational system in Melusi is very well supported by multiple stakeholders outside of Melusi and saw this interface as a leverage point to gather information. We observed the need for a safe and healthy place for children to play.

The Reality Studio group worked with the Child perspective. Children are claimed to be the longest-term stakeholder in a community of society (Winters 2010:85) as well as sharing valuable information regarding their household conditions. It is important to include these vulnerable stakeholders in the design process because public space is for everyone especially for children (Danenberg et al 2018:20). Studies have shown that children are depending on healthy public space for emotional, cognitive, social, and physical development (Danenberg et al 2018:20).

“Children are the next generation who will face a range of global problems that our planet has never seen before. They will face immense challenges, eg, climate, population, migration. Therefore, the urge rises to prepare our children in becoming urban dwellers that are engaged and are encouraged with longevity to learn about and anticipate on external threats and challenges.” - (Danenberg et al 2018)



Figure 1.31: Informal discussions with the children of the Mydo Youth Centre after a workshop have been completed (Zorn 2021).

Melusi Plate Game



GAME

01

Figure 1.32: Plate game workshop played with the children of the ECD in Melusi (Zorn 2021).

TWO GAMES PLAYED WITH CHILDREN IN MELUSI

MELUSI PLATE GAME

The Reality studio team realised that there is a nutrition problem in Melusi through the interviews with the teachers of the Regae ECD and the COPC health workers. The team worked with nutrition as a key theme and to investigate the household nutrition through the children. The games were developed to be suitable for both the ECD children (figure 1.33-1.34) and the Mydo youth centre (figure 1.35-1.36) children. It came to our attention that children from the ECD needed a lot more visual aid and a teacher’s input to translate the exercise to the children.

ECD CHILDREN PLATE GAME



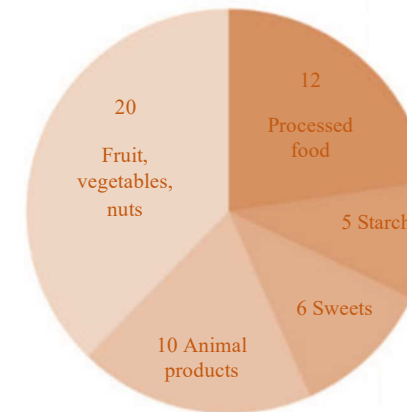
MYDO YOUTH CENTRE



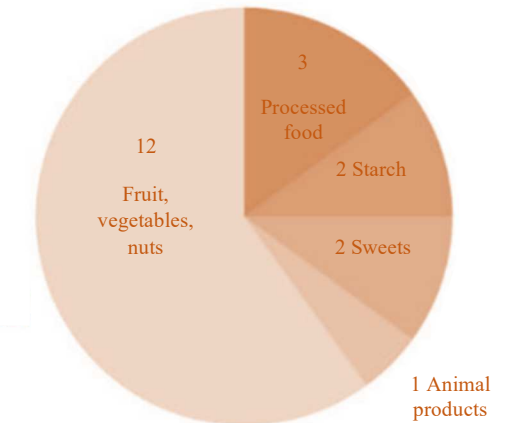
Figure 1.33-1.34: Melusi Plate game played with Regae Preschool of hope (Zorn 2021).

Figure 1.35-1.38: Melusi Plate game played with Mydo Youth Centre (Zorn 2021).

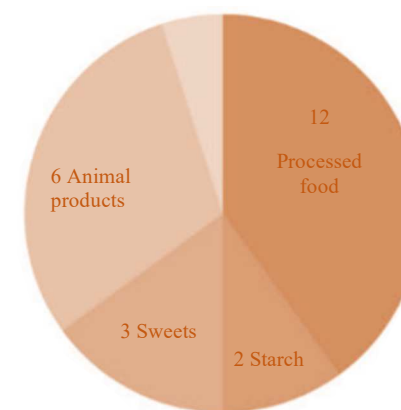
TOTAL GIVEN FOOD



BOTTOM 20 FOOD



TOP 20 FOOD



TOTAL CHOSEN FOOD PER ITEM

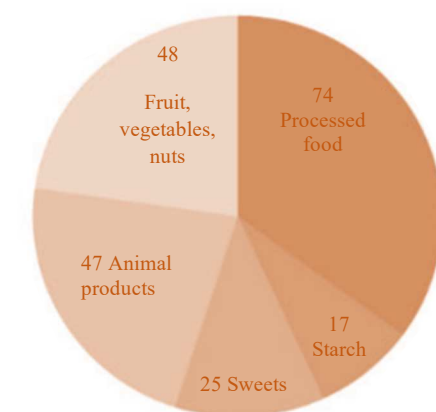


Figure 1.39: Findings of the plate game (Reality Studio 2021).

The results showed that the most popular foods were, processed foods as per figure 1.39. The reason for this is that the community members does not have fridges or freezers to keep fresh products. Most of the products consumed is can products (Reality Studio 2021).

**Please view Annexure B in conjunction with figure 1.39.*

Melusi Water Game



Figure 1.40: Illustrate the results of the Melusi water game (Zorn 2021).
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MELUSI WATER GAME

Water is a very important resource in Melusi. Due to the information received in the interviews with the COPC researchers and the teachers it was evident that Melusi is dependent on Municipal water through refilling the JoJo tanks on site every day. Due to the limited safe water resources available on site the Reality Studio students tested the water knowledge of the children regarding water recycling for other purposes and how do they use water in their households. Due to the complexity of the concept “water recycling” the game was only suitable for older children and has only been conducted with the Mydo Youth Centre children.



Figure 1.41-1.43: Melusi water game played with the children of the Mydo Youth centre (Reality Studio 2021).

WATER GAME RESULTS



Figure 1.44: Drawings of water practises drawn by the children of the Mydo Youth Centre (Zorn 2021).

	Waste water / Garbage dump	Drinking water	Pond / Quarry Hole	Watering the Garden	Washing the Dishes	Water treatment / Municipality
Brown water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Grey water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Rain water	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clean water	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Figure 1.45: Findings of the Melusi Water game (Reality Studio 2021).

**Please view Annexure B in conjunction with figure 1.45.*

Play Africa Workshop

GAME

03

Figure 1.46: Play Africa Workshop with the Mydo Youth Centre and Co-design workshop (Zorn 2021).
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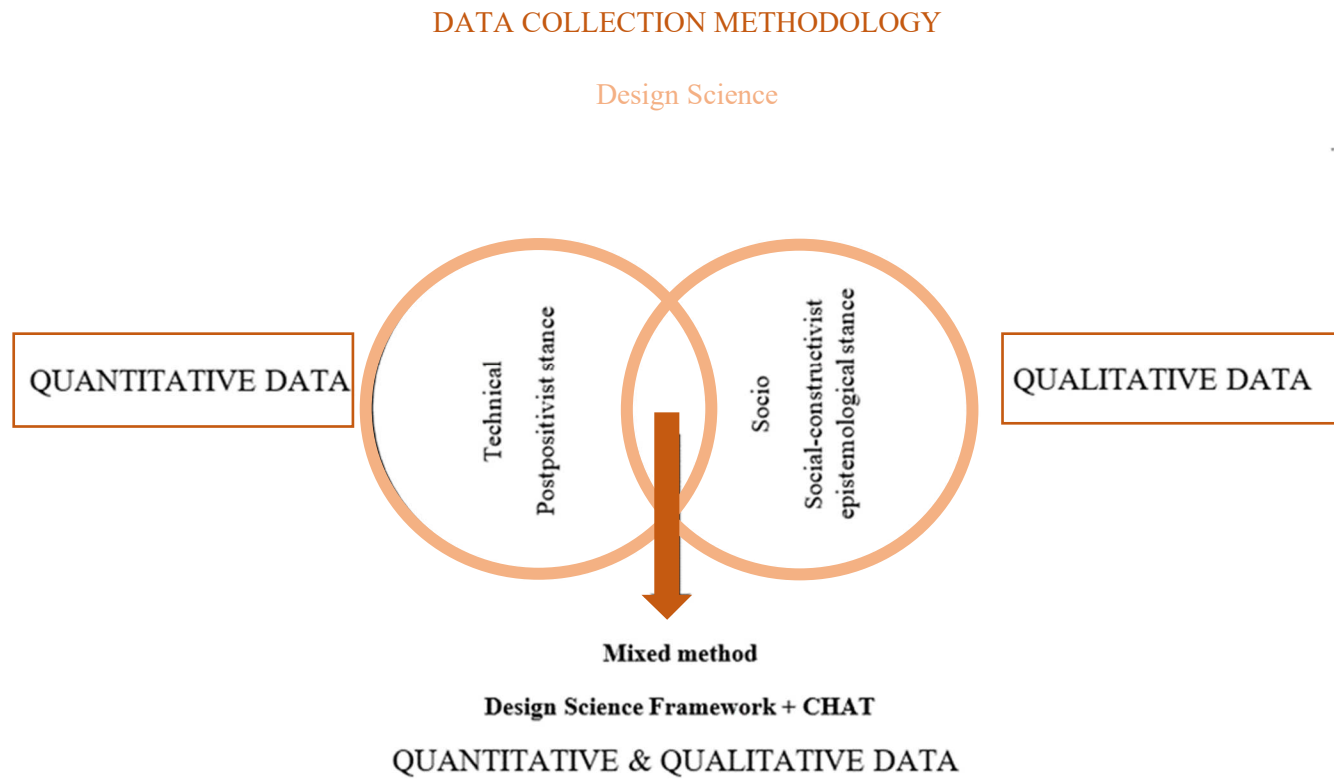


Figure 1.47: Author's understanding of Design Science framework (Author 2021).

A study done by Rana Aburamadan and Claudia Trillo (2020), suggests design science as a successful design method especially in complex socio-technical spaces. Design science is a user-centre design approach where professionals facilitate the design process through an iterative design cycle of data collection and analysis (Wieringa & Director 2013 ; Aburamadan &Trillo 2020:219). Design science process was used in the on-site workshops with the children focusing on the child's perspective that led to the design decisions made in the Reality Studio.

Due to the complexity and multi-layered nature of the site this project followed the Interpretivist paradigm which requires a holistic understanding of the environment, the circumstances, and vulnerabilities. These objectives can only be met with onsite informal interviews and focus groups with community stakeholders (Combrink 2015, Kivunja & Kuyini 2017). The Axiology of this study is subjective, and the data collection method is qualitative (Kivunja & Kuyini 2017).

CO-DESIGN WORKSHOP WITH PLAY AFRICA

After the games we played with the children the Reality Studio conducted a co-design workshop with the Mydo Youth centre students. The workshop was structured according to the design thinking method going through the phases of EMPATHIZE-DEFINE-IDEATE-PROTOTYPE-TEST-SHARE.

*Please view Annexure B in conjunction with figures 1.48-1.52.



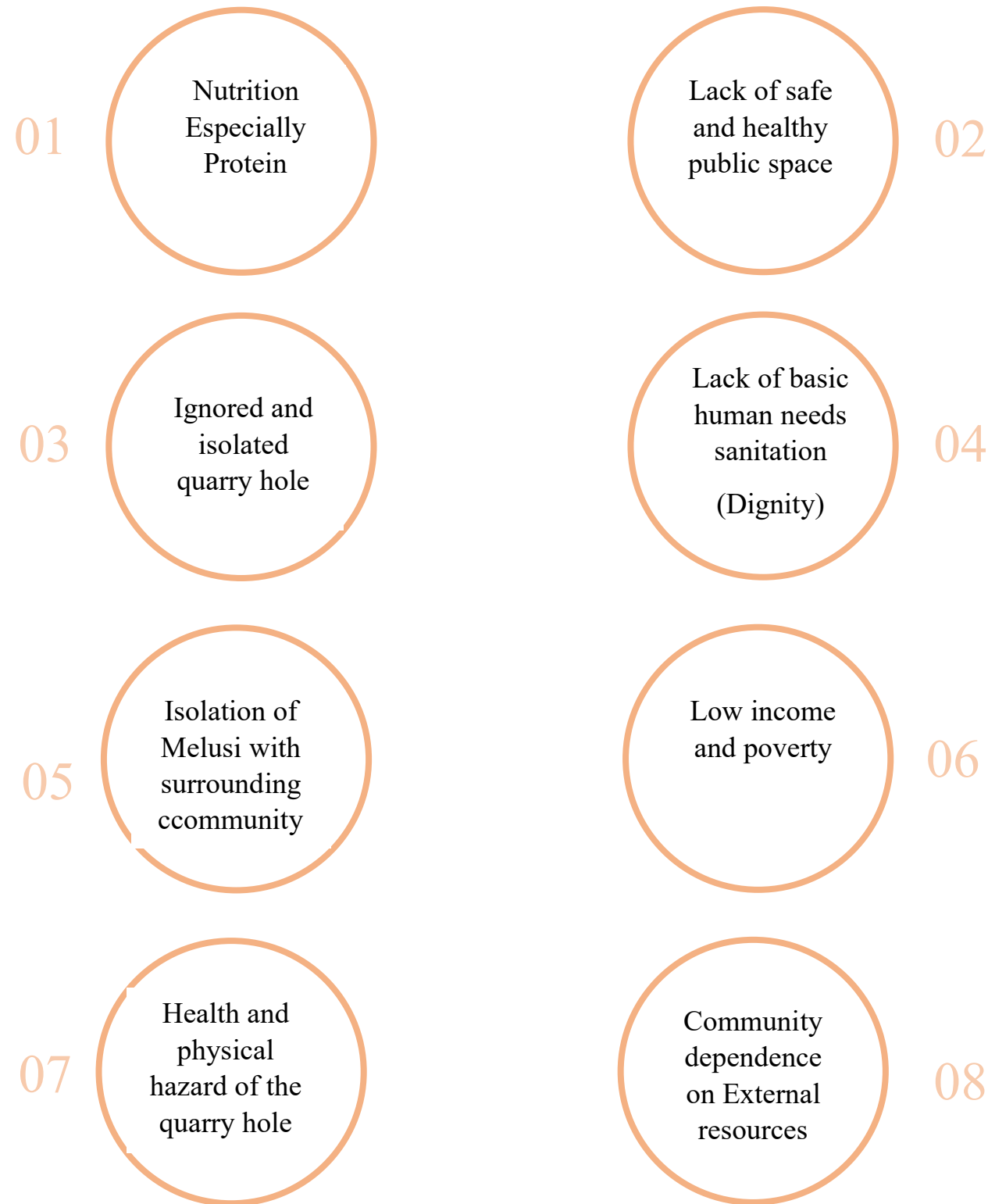
Figure 1.48-1.52: Play Africa Co-design workshop using the design thinking method (Zorn 2021).

PROBLEMS IDENTIFIED ON SITE

PROJECT INTENTIONS

By analysing the qualitative and quantitative data collected on site the following problems were identified

The project intentions listed on a scale from socio to ecological needs.



HUMAN | SOCIO

- Community independence from external resources.
- Supply Melusi's with basic human needs.
- Provide healthy and safe public space and the freedom to interact, socialize and play. To make the edges of the quarry hole safer.
- Add to the local economy providing work opportunities to sustain themselves.
- Challenge the perspective of the current quarry hole as being a hazardous place to a resourceful space in a sensitive manner.
- Re-appropriate the post-industrial quarry hole, adding value to the previously abandoned site and scarred landscape.

ENVIRONMENT | ECOLOGICAL

RESEARCH QUESTIONS

How can catalytic architecture mediate the socio and ecological needs of a complex landscape towards community independence and self-efficiency in a vulnerable community?

PROPOSED RESPONSE

RESOURCE INTEGRATION

[catalytic nexus mediator between the socio and ecological complexity]

Piet Vosloo (2018) identified the following aspects which could be used as a criterion to design a 'New wilderness' in an urban environment namely: aesthetic qualities, ecological benefits, and economic benefits. These aspects have a positive physical and psychological effect on human health and wellness. (Vosloo 2018). We can no longer think of land as a resource to be used for only one purpose, and because of our rapid urbanization, we must think of our open spaces as multifunctional (Bradshaw and Chadwick 1980:282-283).

According to Piet Vosloo (2018:44), post-industrial and abandoned quarry holes in urban areas are well suited to be transformed into open green public spaces. There is a need for public spaces in the urban context to foster a harmonious co-existence between humans and the environment in informal contexts (Vosloo 2018:44).

"Provisions for leisure for the quality of life are as important as those for health and education."

- (Vosloo 2018:44)

Figure 1.53: Main problems identified after the qualitative and quantitative data have been analysed (Author 2021).

The National Environmental Act 107 of 1998 states: “Everyone has the right to have the environment protected for the benefit of present and future generations.” (Burmeister 2014:2-3). Municipalities should intervene by supplying vulnerable communities with tools and resources to enable themselves through catalytic public spaces which create bridges (nexus) with the surrounding privileged suburbs.

Melusi community members do not have an interactive and positive relationship with the quarry and the wetland. These natural resources are currently in isolation or neglected dumping sites as the current practices are in dealing with quarries in vulnerable communities, even though this is illegal in terms of Section 26 of the NEMA Waste Act and results in more dangerous sites in terms of health and well-being (Vosloo 2018).

According to Karina Landman (2018:2), rapid urbanization not only surfaces many challenges but also opens opportunities for adaptation. Organic urbanization increases the pressure on city councils and municipalities to provide more services to all inhabitants. The pressure of supplying services influences the natural resources available negatively. Humanity is constantly confronted with this social and ecological imbalance which is detrimental to our landscapes- Socio needs before ecological needs. This mini dissertation aims to challenge this imbalance. *Invention's ecology* advocated by Turner (1994:360) suggests to not only conserve natural resources but also natural ecosystems in the process towards restoration of a landscape. Resilience thinking is crucial in solving complex problems as it could integrate complex systems and contextual relationships in a single dynamic system-based approach (Peres 2015).

This mini dissertation will investigate the possibility for post-industrial landscapes to be transformed into valuable resources for vulnerable communities. These vacant and abandoned sites within our urban landscapes make excellent sites for legal informal settlements to exist with the support of the government to plan for informality as Kirkwood (2011:xiv) stated that these vacant land can be reintegrated through design to meet the needs of the surrounding communities in terms of food security, basic services and social inequality (Burnmeister 2014:2-3). The existing quarry hole in the community poses huge opportunities for the community concerning resources. Due to the opportunities the quarry hole poses, the site is considered a possible site for intervention.

The following theories and themes will inform the manifestation of the intervention:

BIOPHILIC DESIGN PRINCIPLES

To achieve interactive architectural interventions, it is hypothesized that one will have to apply biophilic architectural principles to develop innovative and holistic thinking styles to develop problem-solving skills (Abdelaal & Soebarto, 2018). There exists disconnectedness (Lemmens & Zwart, 2004) to our natural environment that entails multiple detrimental effects on human health and wellbeing (Kaplan, 1995). Biophilic architecture intends to repair the reciprocity of man's relationship with the natural environment, which is crucial for optimal human function and self-actualization (Bouberki, 2008). Biophilic design is necessary for the manifestation of the *Catalytic Nexus* where the architecture will act as the mediator between addressing the socio and ecological needs. Another informant that led to biophilic principles is the visible and invisible perceptions and actions towards the quarry hole. The adults implemented the story and safety measures of the mythical creature living in the quarry which should be respected in the design. *Prospect and Refuge*, a biophilic design principle will be used to inform the manifestation of spaces, contesting the individual towards the water but also creating spaces of refuge and safety as illustrated in figures 1.54-1.55 (Dosen & Ostwald 2013).

01 REFUGE - SPATIAL MANIFESTATION

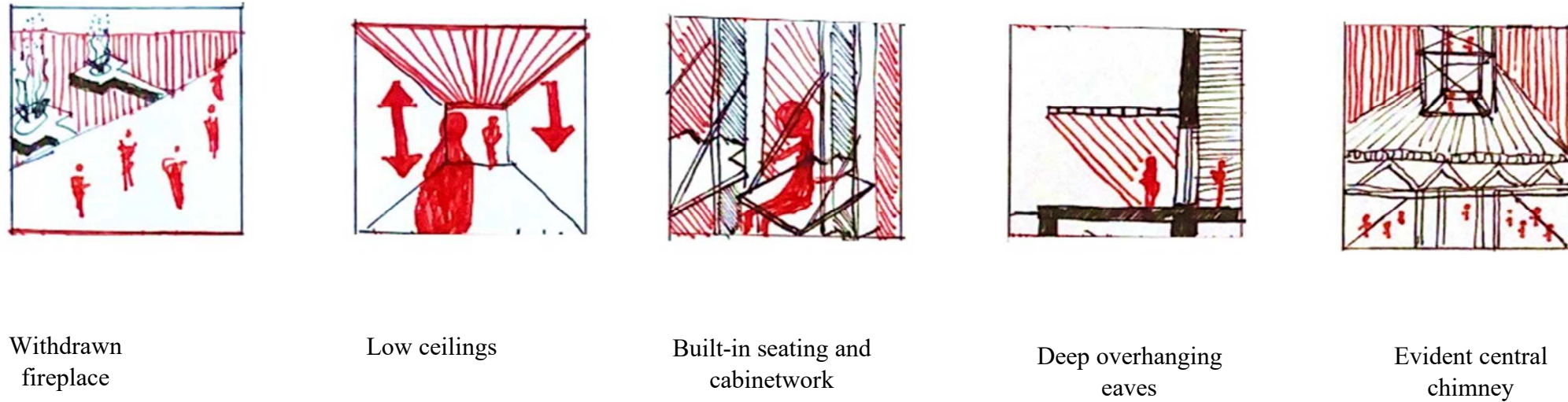


Figure 1.54: Biophilic design principle of refuge illustrated spatially (Author 2021).

02 PROSPECT - SPATIAL MANIFESTATION

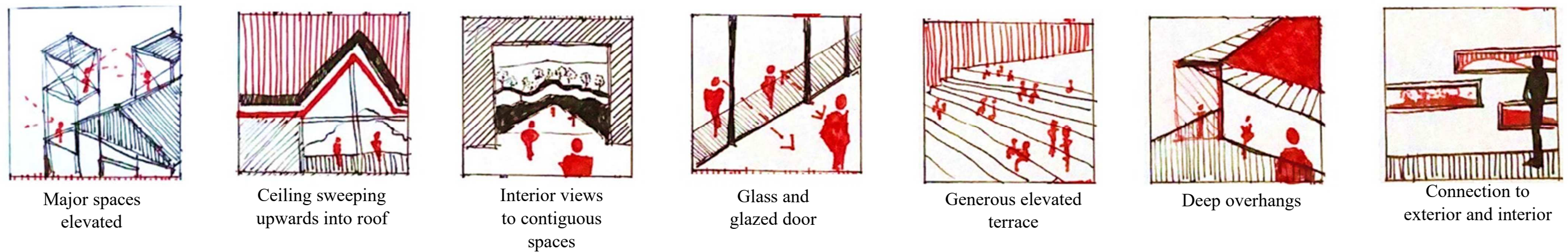


Figure 1.55: Biophilic design principle of prospect illustrated spatially (Author 2021).

RESILIENCE THINKING

“A resilience-based approach focusses on learning how to respond, adapt to, and evolve with change and surprise, while avoiding changes that would move local and global socio-ecological systems closer to tipping points that would threaten life-supporting and life-enhancing capacity of these systems”- (du Plessis 2012:17)

Resilience thinking has the potential to break away from the existing linear thinking method towards public space adaptation to evolve into thriving socio-ecological systems. The main constraint experienced by the Government is to intervene in informal settlements and not be financially obligated to sustain these interventions. This is evident in Melusi where the community is dependent on the municipality to fill their JoJo water tanks. This project will strive to find design solutions ensuring individuals and living spaces of continual growth and independence after practical completion (Jack 2014) and simultaneously improving the social and environmental needs of the landscape.

Chapter one identified the problems and introduced the proposed framework to use in complex landscapes. The second chapter will focus on a precedent study testing the proposed framework as well as how the problems identified on site translates into programs (catalyst) and systems (nexus) towards a holistic intervention towards co-existence, self-efficiency, and community independence.