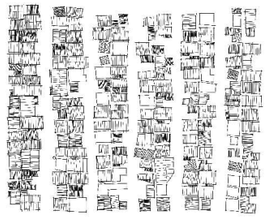


CHAPTER 03

CONTEXT

Figure 3.1. Plastic View drone image (MPIP 2021)

3.1
INTRODUCTION

Having discussed the research intentions and data collection process in chapter one, the following chapter will discuss the findings of the data collection, chosen site conditions and their implications on viewing Plastic View's resilience. From the earlier explanation of the settlement's deficit of basic infrastructure, the intended programme is unpacked to express the intention of improving internal resilience and enabling the community. The argument is built towards speculation of the rapid growth of Plastic View in response to nearby urban development, with a resultant site vision. The concept expands on spatial and programmatic drivers whilst introducing the typology layers that make up Plastic View's pattern language. The patterns, registered through the diverse methods of desktop studies, photography, interviews and observations, inform the design explorations. This process respects the existing conditions and language of Plastic View. The initial design explorations are critiqued to guide the development towards a refined intervention.

3.2
RESEARCH FINDINGS

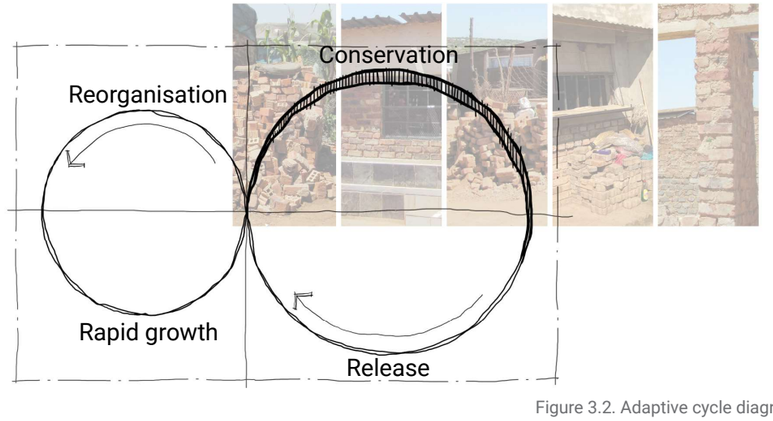


Figure 3.2. Adaptive cycle diagram (Author 2021)

The conservation phase

The early observation of Plastic View's ongoing dwelling upgrades provides insight into the dynamics of its adaptive cycle. The adaptive cycle of a system, in this case, Plastic View, provides a framework to understand the internal operating connections and how they dictate a potential change in the system (Walker & Salt 2006:75). A system generally proceeds through four phases of an adaptive cycle; rapid growth, conservation, release, and reorganisation (Holling 1986:95).

The upgrades in Plastic View primarily consist of the transition from perishable plastic sheeting and timber boards to clay bricks as the primary cladding materials of dwellings. The number of brick dwellings has increased significantly in the past year, from scarcely any to thirty four as of April 2021 (Ebersohn et al. 2021:42). In addition to this, several stacks of bricks were observed in front of and adjacent to dwellings. Interviews confirmed that the homeowners were collecting a sufficient number of bricks to eventually reconstruct their homes with the more permanent material. This gradual process of upgrading points to Plastic View being in a conservation phase of its adaptive cycle. According to Walker and Salt (2006:76), the conservation phase consists of the accumulation and storage of resources for eventual efficient use. A sense of stability increases with a dependency on the favoured structures and networks (Walker & Salt 2006:77), as seen in Plastic View's favouring for brick dwellings. The dependency also, however, makes Plastic View increasingly vulnerable to disturbance (Walker & Salt 2006:77), due to the restricted network that exists for sourcing the favoured bricks.

Figure 3.3. Dwelling upgrade observations (Author 2021)

Material sourcing

The acquisition of bricks to use in construction in Plastic View is currently a slow, inconsistent process. The residents primarily rely on the formal construction industry to supply used and excess bricks. The bricks are usually sourced from construction sites in the area (often using their jobs in the construction industry as a connection) or found in the immediate proximity of Plastic View. Bricks from construction sites are often dumped in the fields adjacent to the settlement or on the road leading to its main entrance. Hence, the process of collecting the bricks is slow and unpredictable as they rely on an external source. It became evident that many residents have to store their bricks at their existing homes as they build up enough stock to begin upgrading, or save up enough money to buy cement and other materials. In reference to Plastic View's phase of conservation, there is little redundancy in the process of brick collecting. Not only is the process of acquisition narrowed to a single mode, but it is also highly dependent on external systems. According to Ahern (2011:342), when a service is provided by a single operation, it is more vulnerable to failure, whereas a decentralised system, with multiple internal and external operations, is more resilient. To aid the process of incremental upgrading in Plastic View, which will, in turn, improve living conditions and capacity to respond to disturbance, the settlement requires an expansion of networks that provides quality construction materials for more permanent dwellings.

Mitigation and adaptation

The conducted interviews (29 March - 31 March) and observations provided an understanding of the different ways dwellings continue to be upgraded over time. By analysing the changes as either reducing impact of disturbance or responding to the impact of disturbance, there is a better understanding of Plastic View's internal resilience. The shift to more permanent materials like brick and corrugated iron and the addition of one metre wide passages between dwellings that double as firebreaks indicates the mitigation of disturbance impact. Through the conducted interviews, it is understood that residents have recognised that these changes can prevent flooding, sun and fire damage and improve levels of comfort, and resultantly express the capacity to realise the changes. The process of maintenance due to material degradation, and rebuilding due to disturbances such as fires and evictions, shows the adaptive capacity for disaster response. Ideally, the settlement can progress to a state of mitigating disturbance rather than

responding to it, which furthers the argument for upgrading to brick dwellings. The transition from perishable plastic sheeting and timber boards to permanent brick and concrete not only increases resilience against fire and weather conditions, but also shifts the dynamics around settlement longevity (Kamalipour & Dovey 2020:4). The longevity can subsequently create opportunities for broader permanence, with de facto tenure and connection to formal servicing (Kamalipour & Dovey 2020:4).

The incremental upgrading in Plastic View is already being conducted by the residents themselves, with the continuous reconstruction of their dwellings. The opportunity for architectural intervention is grounded in the need for an improved operation of material acquisition; however, the process of upgrading is

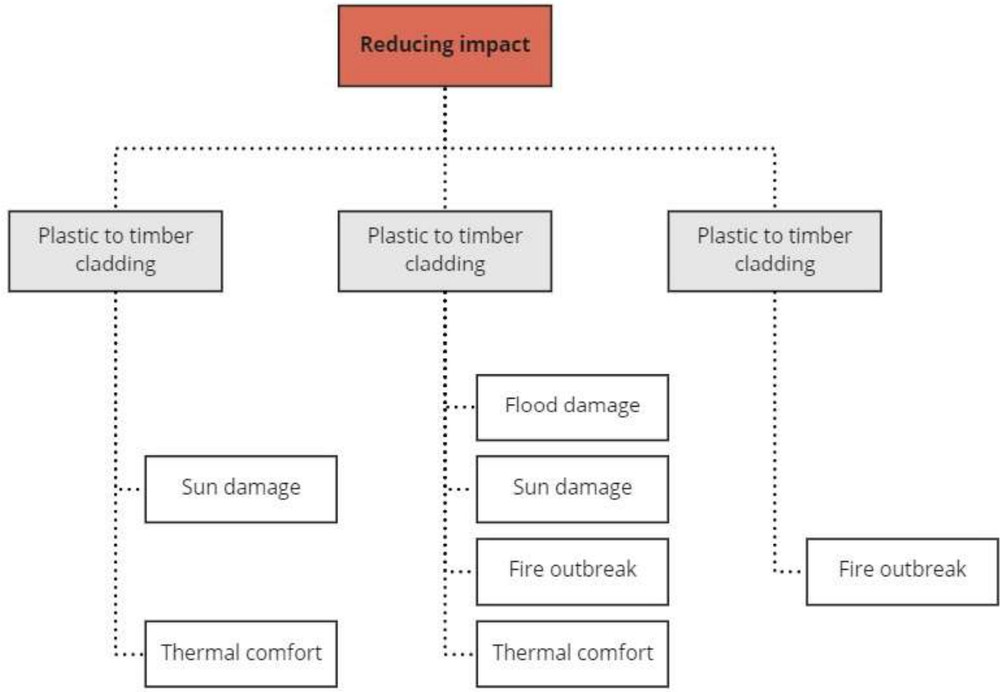


Figure 3.4. Pre-emptive upgrading diagram (Author 2021)

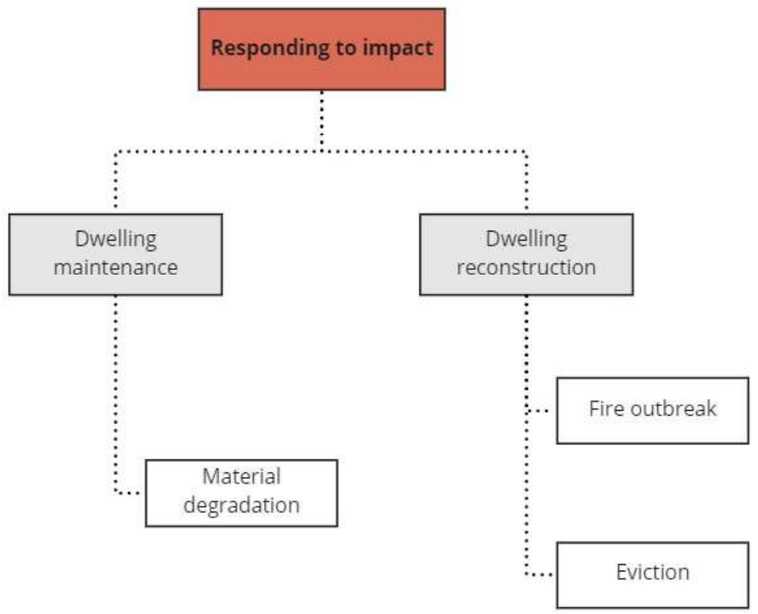


Figure 3.5 Responsive upgrading diagram (Author 2021)

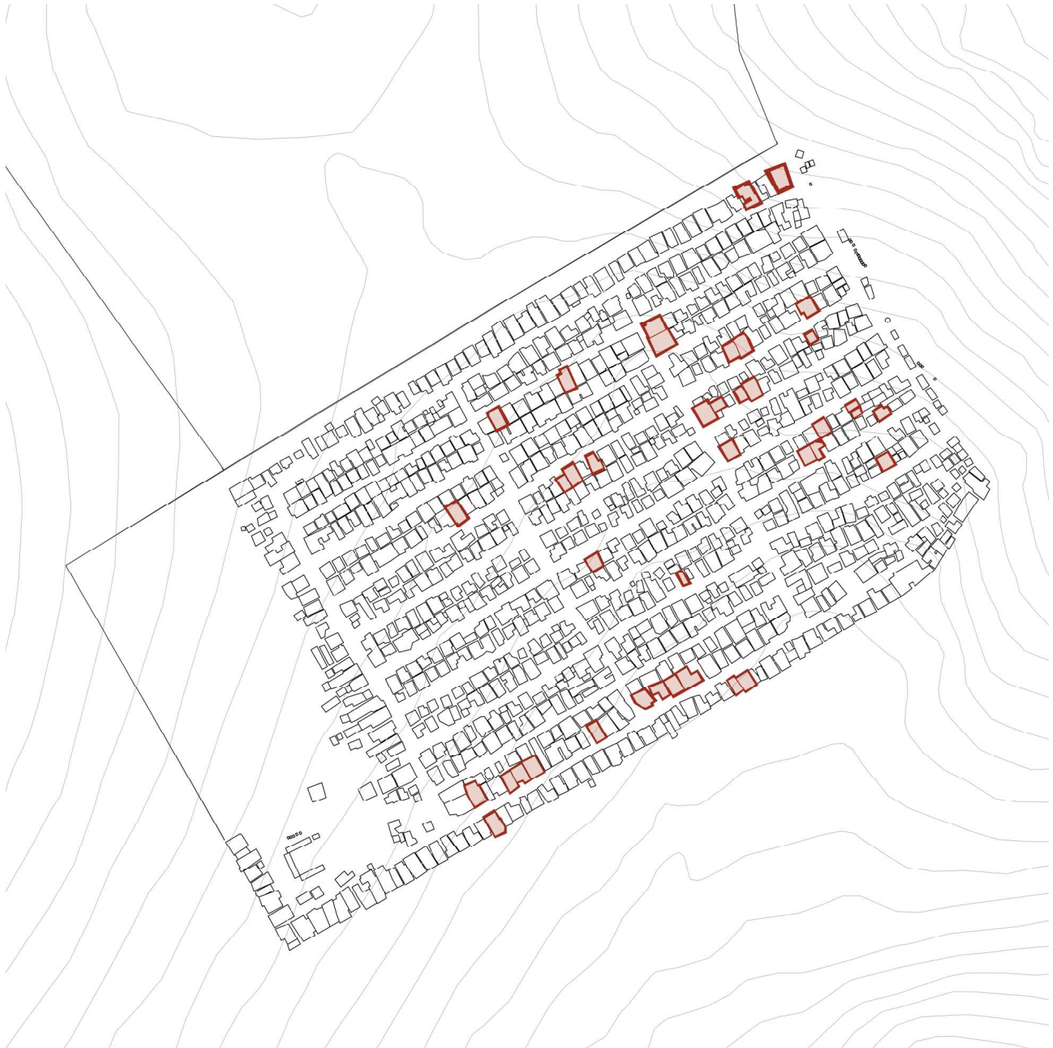


Figure 3.6. Brick dwelling map (MPIP 2021)

Low quality dwelling

Brick stockpiling

High quality dwelling

Figure 3.7. Upgrading process (Author 2021)

not confined to dwelling construction alone. It creates additional avenues for formalisation within the settlement, including necessary infrastructure, sanitation and public space. Such avenues are desired within Plastic View, as expressed in the conducted interviews; however, the community has not expressed a capacity to realise this degree of upgrading without assistance from external parties. The development and upgrading discussed in this dissertation has the potential to shift Plastic View into the rapid growth phase of its adaptive cycle, because of its creation of new opportunities and resources (Walker & Salt 2006:76). Guiding the settlement out of its resilience-decreasing conservation phase, whilst avoiding a disturbance-driven release phase, will be more conducive to its longevity and progression towards formality (Walker & Salt 2006:76). The full scope of upgrading, to be addressed through architectural intervention, will be unpacked in the following section as the identified site and programme is discussed.

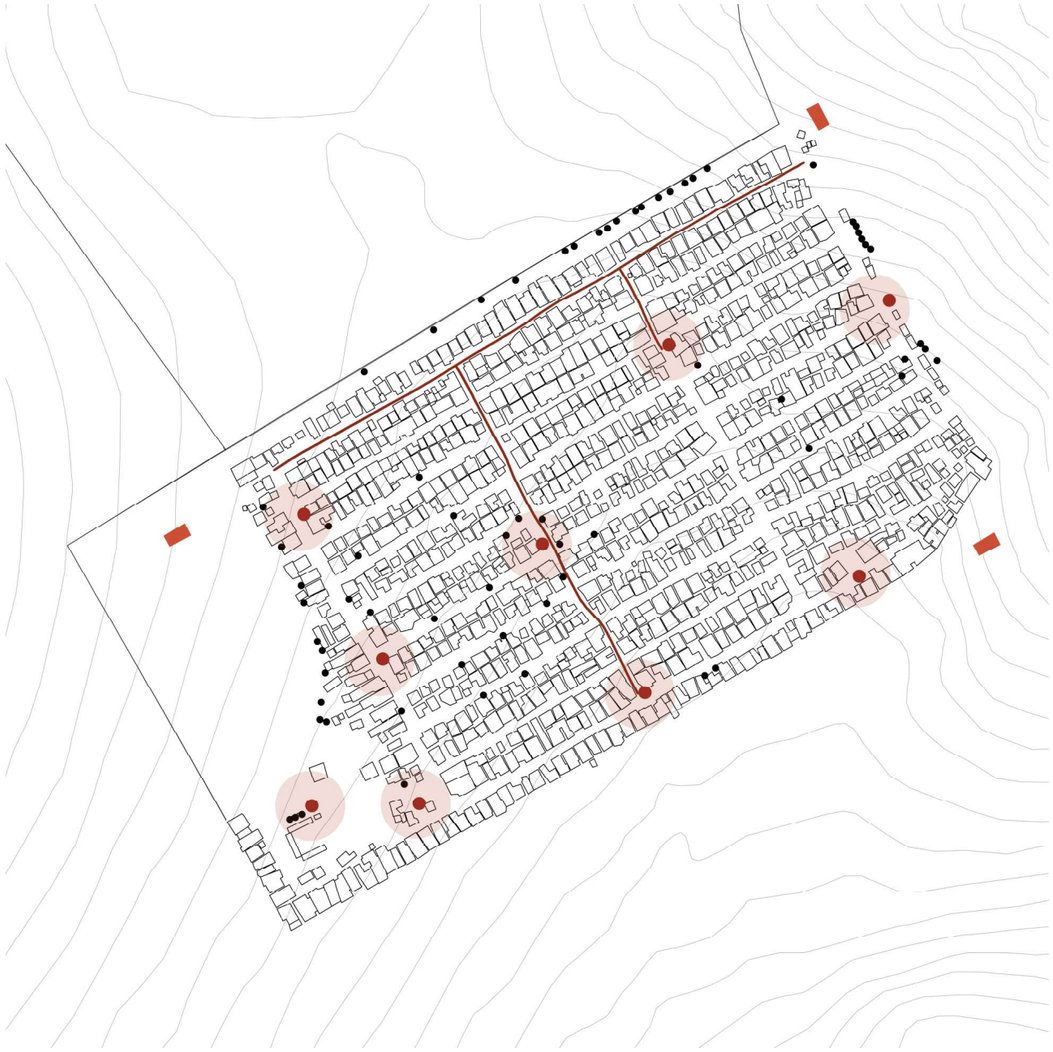


Figure 3.8. Meso infrastructure map (MPIP 2021)

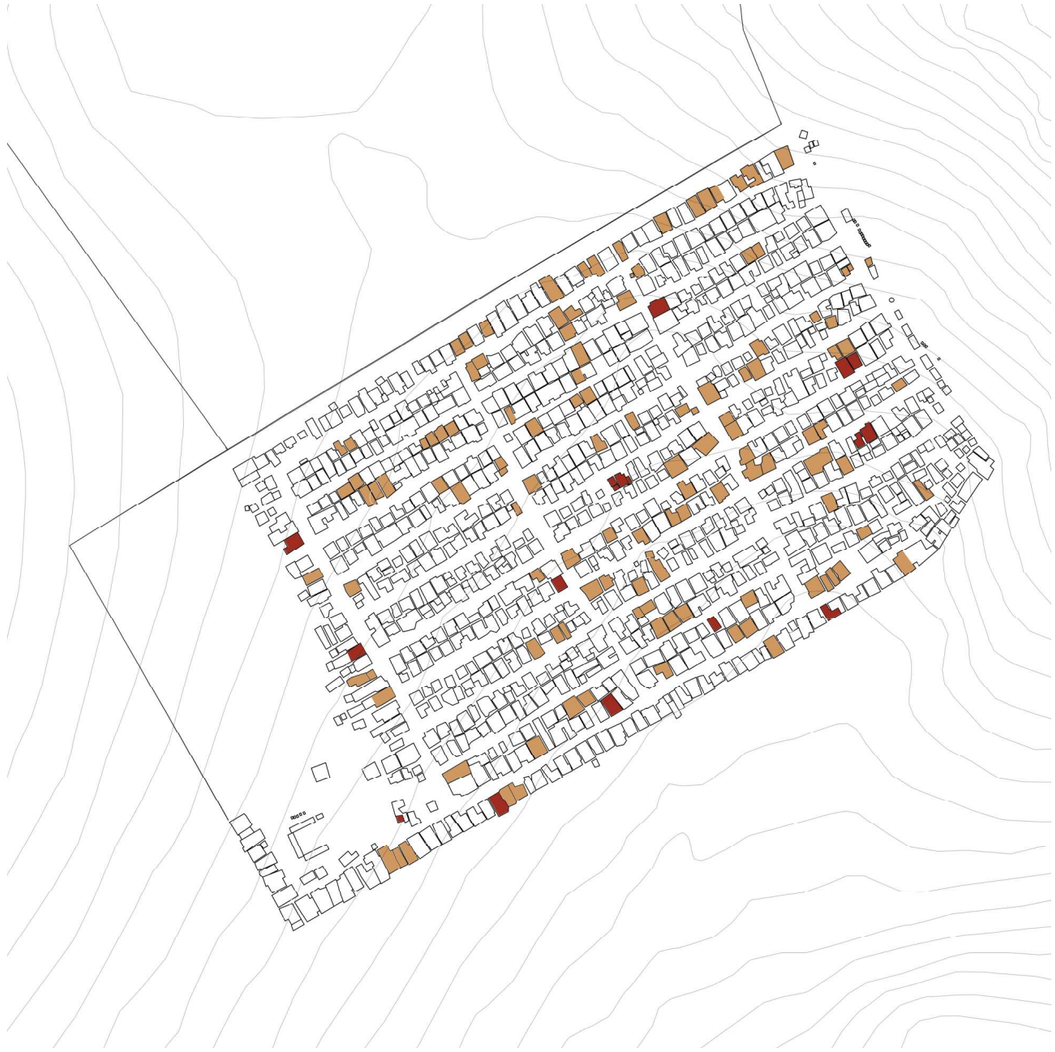


Figure 3.9. Meso economy map (MPIP 2021)

Figure 3.10. Macro waste map (Author 2021)

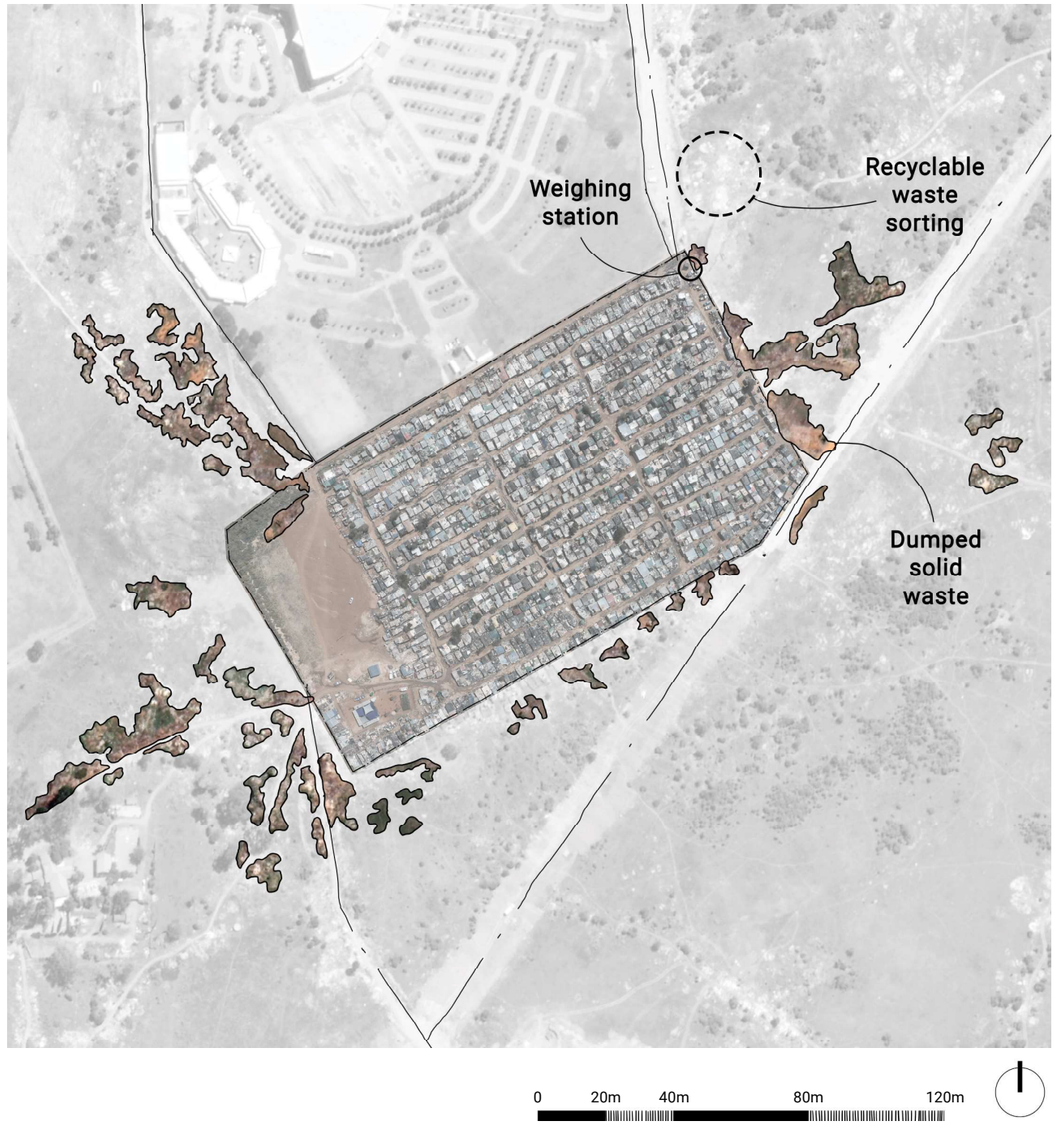


Figure 3.11. Meso waste map (Author 2021)

3.3
SELECTED SITE

The identified site for intervention within Plastic View exemplifies the current and speculated growth occurring in the settlement. Positioned along the north-eastern boundary of Plastic View (see figure 2.3), it consists primarily of the wide street, running the 200 metre width of the settlement, that connects the main entrance with eight of the ten internal streets. The majority of residents with formal employment move along the street, both early morning and late afternoon, as they come to and from work. As a result, the site can be considered an emerging high street due to the growing presence of small businesses capitalising on the substantial foot traffic along the street.

Since 2018, twelve new structures have been built along the street, of which more than half are occupied by small businesses, including spaza shops and barbers. The dwellings on the corners of the internal streets have also, in recent years, opened shops and kitchens onto the wider high street. The same dwellings are also actively being upgraded with more permanent materials, showing a stronger investment in the site's longevity. In response to the activity on the site, several porta-loos have been gathered along the street for a more centralised, efficient use.

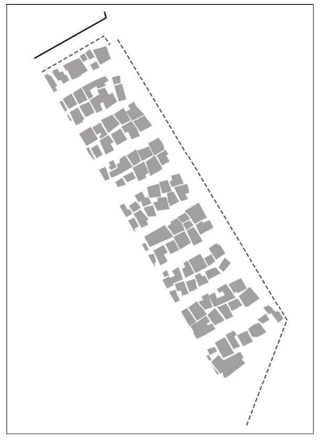
The site is host to various informal recycling practices. Positioned at the main entrance of Plastic View lies a material resale station that sources construction materials, primarily steel, to buy and sell to residents in the settlement. In the field adjacent to the main entrance, waste pickers offload their collected waste to sort and store until trucks arrive to transfer the plastics to larger recycling centres. Unfortunately, the waste built up by the pickers, combined with the solid waste and food waste (that which isn't regarded as usable by the community) discarded in the field behind the high street, has led to an alarming level of pollution on the site. The pollution has gradually damaged and pushed back the line of vegetation that frames Plastic View, leaving both unsightly conditions and a threat to the health of residents.

Legend

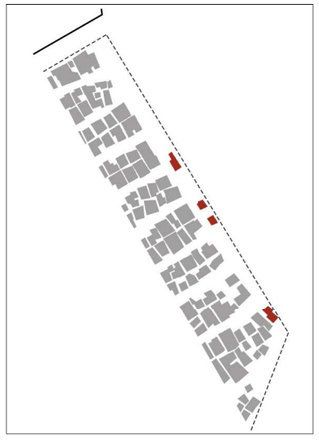
01. Waste sorting area
02. Main entrance
03. Material resale station
04. Porta-loos
05. Small business (Spaza shop/barber)
06. Water tank
07. Dumped solid waste

Figure 3.12. Selected site map (Author 2021)

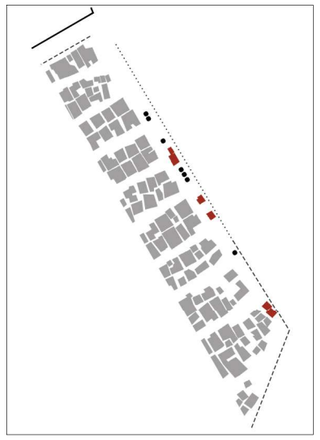
2018



2019



2020



2021

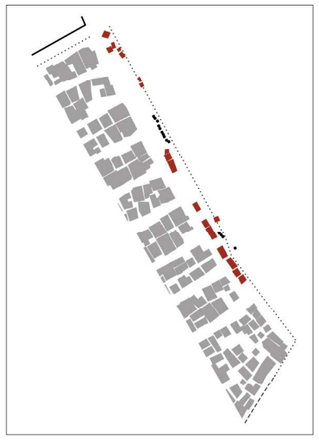


Figure 3.13. Selected site growth (Author 2021)

Waste sorting area

Small business

Main entrance

Water tank

Porta-loos

Pollution

Figure 3.14. Selected site photos (Author 2021)

3.4
URBAN FRAMEWORKS

The growth conditions of the selected site provide a new perspective on how Plastic View may continue to expand in the future, should they not be forcibly relocated by the municipality. Plastic View's surrounding neighbourhoods continue to develop through numerous plans for estate housing projects and infrastructural installations. Most notably, the Mooikloof Mega City project is looking to develop approximately 50,000 apartment units, which will create an estimated 115,000 direct and indirect jobs (Ndlazi 2020). Development such as this will continue the existing pattern of the urban poor following formal work opportunities, particularly in the large-scale construction operation of gated communities.

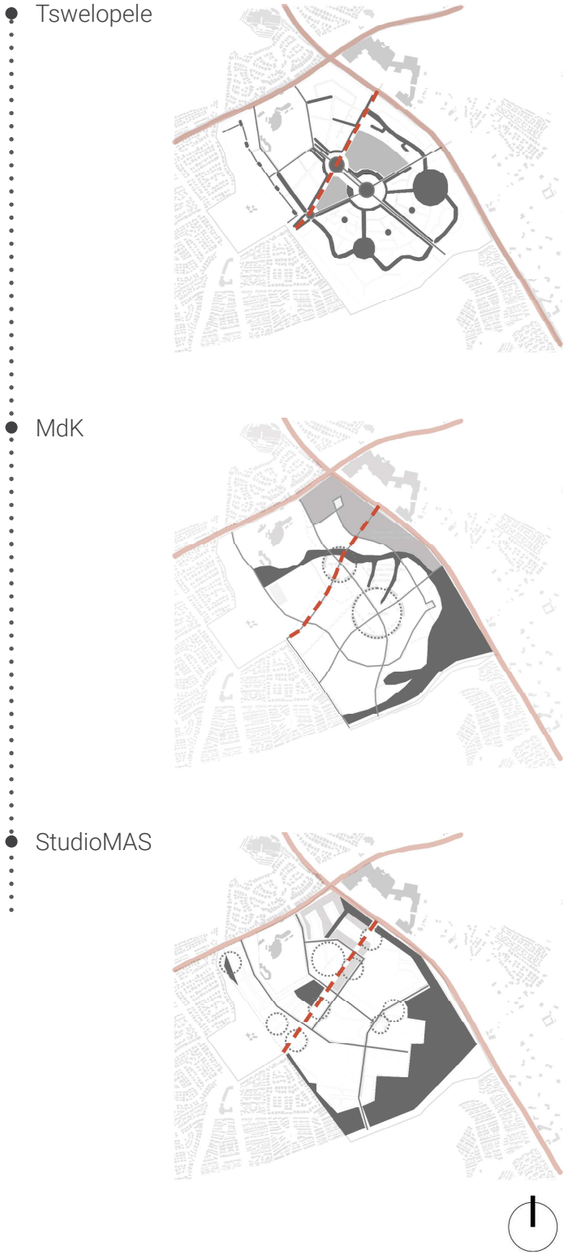


Figure 3.15. Urban framework maps (MPIP 2021)

Figure 3.16. Consolidated framework map (Author 2021)

3.5
SITE VISION

Thus, the speculation is that Plastic View will expand, likely doubling in size, in unison with the sprawl of gated communities in the area. This expansion will possibly occur outwards from the existing north-eastern boundary. The main entrance, currently at the corner of Plastic View, would become a central access point for the settlement. When the municipality partially formalised the settlement in 2009, the dwellings were organised into a grid structure with the street system visible to this day. It is reasonable to assume that a similar grid structure would be implemented for the expansion if the municipality intervened once again. This, however, will only exacerbate the problems associated with the current density of dwellings in Plastic View, including fire outbreaks and poor health conditions. The intervention within the chosen site will thus require a reconsideration of the settlement's density, which would serve as an informant for the organisation of future extensions of Plastic View.

In response to the speculated growth, the chosen site becomes increasingly important as a central, dynamic high street for a larger settlement. The speculation furthers the argument to implemented a "safe-to-fail" system on the chosen site (Ahern 2011). Future expansion would likely bring about changes in Plastic View's adaptive cycle due to an increased population, greater health and public service demands. The dynamic within the settlement will shift according to needs and threats, and so too should the capacity for public architecture and infrastructure to respond to such a dynamic. An adaptable intervention can respond to the existing activity and networks in Plastic View whilst also catering for anticipated growth. Thus, despite proposing structures to house specific initial programmes, the structures may be reappropriated for different purposes and functions.

Legend

1. Central access point
2. Existing settlement
3. Speculated expansion (municipal planning)

Figure 3.17. Growth speculation map (Author 2021)

3.6 PROGRAMME

Plastic View's growing pollution exposes the settlement's exclusion from essential services, specifically municipality-led waste management. The recycling efforts by waste pickers and those that construct their homes highlights informal practices towards managing waste; however, municipal involvement is necessary for a comprehensive waste management system. The existing processes of sorting, selling and dumping waste within the site, provide a foundation for waste management operations with expanded internal and external networks. However, in the interest of improving the adaptive capacity of Plastic View, the existing informal practices need to be leveraged to create a system that can actively mitigate the disturbances identified in the research process. As discussed, the current manner of collecting bricks is a tedious, inconsistent process. By forming new networks through which residents can acquire building materials, the system can increase its redundancy and become less vulnerable to failure (Ahern 2011:342). Currently, plastic waste is only sorted on site before being sold and removed by recycling organisations; however, with the introduction of an upcycling factory, the plastic waste can be reused in situ to generate a constant supply of building materials for the upgrading of Plastic View. These plastic bricks will supplement the existing materials sourced through construction industry dumping and the resale station. The upcycling operation further expands the business of selling materials, provides a further financial incentive for collecting and sorting waste, and reduces the harmful pollution brought on by dumping. As it requires employees, the factory creates local revenue streams and introduces new skills to be learned.

As the intention is to develop the high street and enable the community through incremental upgrading, responding to the other small businesses and functions operating along the street will help with the growth of the site in conjunction with the proposed waste sorting and upcycling operation. Thus, the introduction of market spaces, live/work units and ablution facilities are included in the design development. Combrinck, Vosloo and Osman (2017:34) argue that it is the architect's obligation to favour enablement over provision; thus the intervention, in responding to the existing activity, will follow this approach. Services along the high street, including sanitation, electricity and water provision, should contribute to the longevity of the street by continuously operating in favour of the user regardless of the functions on site.

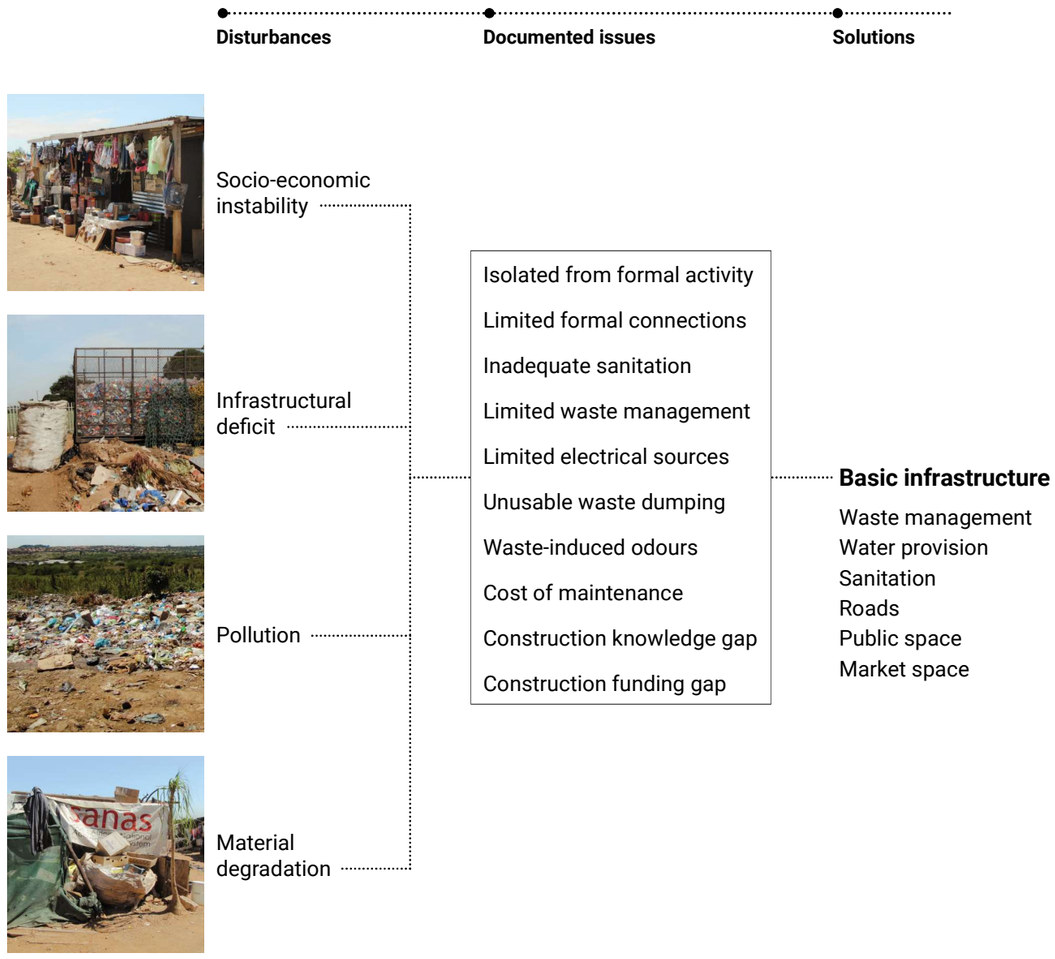
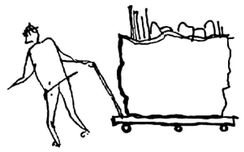
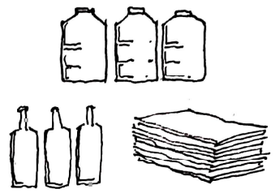


Figure 3.18. Unpacked site disturbances (Author 2021)

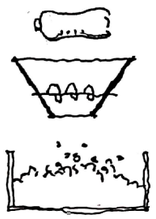
Collecting



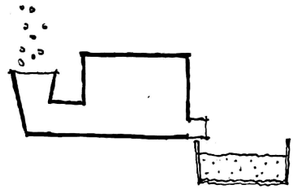
Sorting



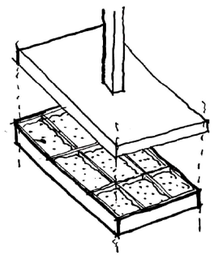
Shredding



Melting



Molding



Distributing

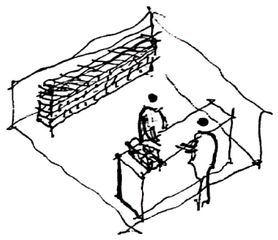
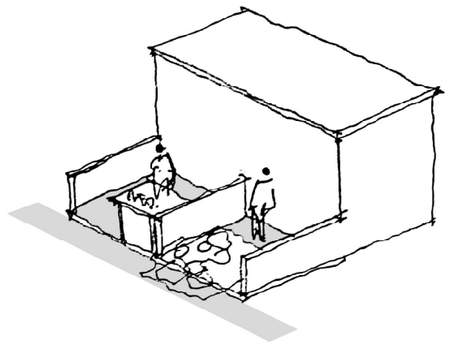
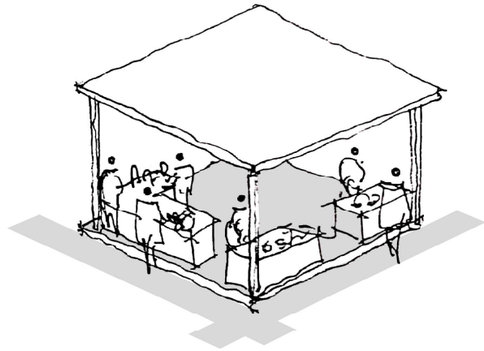


Figure 3.19. Brick manufacturing process (Author 2021)

Trading space



Market stalls



Lockup units

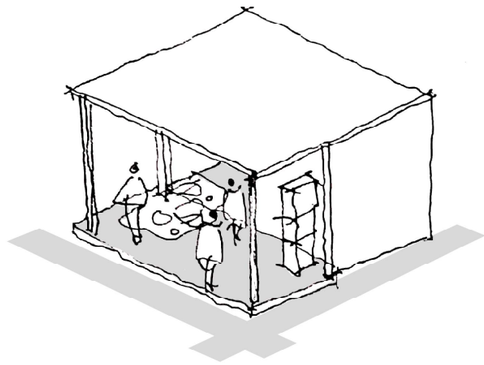


Figure 3.20. Market diversity (Author 2021)

3.7 PRECEDENT STUDY

Project: Silindokuhle upgrading project
Architect: Collectif Saga & Indalo
Location: Joe Slovo West
Port Elizabeth
South Africa
Completion: 2015

The Silindokuhle social development project, by Collectif Saga and Indalo, is located in the informal area of Joe Slovo West, Port Elizabeth. The project was conceived as having four phases, with the first phase being a community hall and the second phase a preschool (Galland, Guérin, Guitard, Rohaut & Sablé 2016). The aim of the project was to design a building that can accommodate a local, informal crèche started by a community member whilst creating an environment of transformative participation with the community throughout the construction process (Galland et al. 2016). A crucial part of the construction of both the hall and preschool was the use of locally sourced, recycled materials, such as glass bottles, pallet wood and tyres (Galland et al. 2016). This was done in the interest of keeping to a small budget, and to respect the maintenance capabilities of the community, as replacements for the original materials used in construction could be sourced with ease in the local area.

The phased planning of the project aligns with the principles of Ahern's "safe-to-fail" system (2011). The community hall was designed to be a temporary creche until the preschool completed construction, after which it would host a workshop for community members that work with timber and metal (Galland, Guérin, Guitard, Rohaut & Sablé 2015). It was thus designed with a degree of multifunctionality and flexibility to meet the changing needs of the growing community. According to Ahern (2011:343), adaptive planning recognises the value in designs being experiments that may face change that couldn't be catered for initially. The incremental approach taken for the Silindokuhle project embodies this notion in its creation of adaptable structures, and the two-way exchange of knowledge that can be carried forward by the community as they continue to upgrade their dwellings and respond to disturbances (Galland et al. 2015).

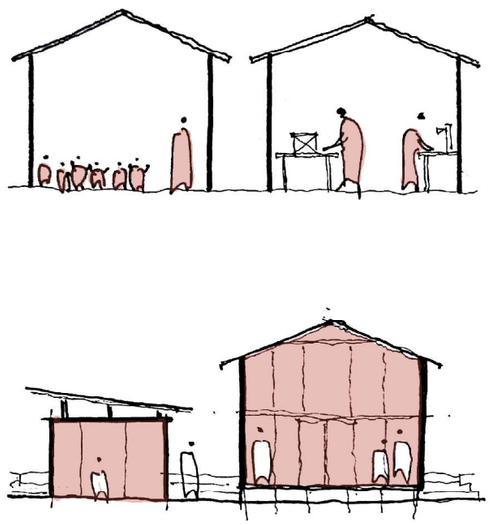


Figure 3.21. Multifunctional hall sketches (Author 2021)

Figure 3.22. Silindokuhle community hall (Loots 2015)

Figure 3.23. Adjacent ablutions (Loots 2015)

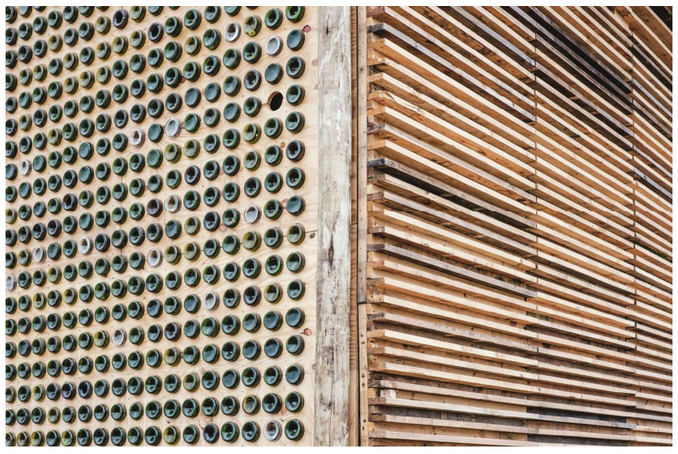


Figure 3.24. Upcycled construction materials (Loots 2015)

Project: Philippi public transport interchange
Architect: NM & Associates
Location: Philippi North station
Cape Town
South Africa
Completion: 2001

The Philippi public transport interchange, by NM & Associates, is positioned at the Philippi North station, Cape Town. The surrounding township, consisting of both formal and informal housing, is undergoing transformation with a focus on improving public spaces (NM & Associates n.d.). Prior to the intervention, the site existed as an urban living room preserved by the surrounding community. Thus the intention was to provide a degree of legibility to the public space (NM & Associates n.d.). The project was successful in that, whilst providing formal services and accommodating public transport, it didn't take away from the existing social activity and informal trade occurring on site. The public space was upgraded with seating areas, vegetation and formal trading units; however, it withheld from excessive provision (NM & Associates n.d.). The formal intervention acted as a catalyst for further informal socio-economic activity, as the community continued to occupy space for informal trading, thus highlighting the project's capacity for reappropriation post-construction.

The trading units provide diversity through a scaled response to the observed informal trading. By offering both formal units and space for informal traders, there are levels of response to the specific function of trade. The diversity creates contingency plans that allow a continuation of the activity should one of the scales fail or fall to disuse (Peres & du Plessis 2014:9). The units themselves are unfitted and lined with a covered walkway with seating (NM & Associates n.d.). The design continues the project's thread of appropriation in the treatment of the unit thresholds as shop owners extend their trading space out onto the walkway to capitalise on the active edge. Unfitted units allow for a greater adaptation and prevent limitations on the types of trade that can occur on-site. The adaptability and enablement that the design provides is the primary contributor to the appropriation and longevity of the site.

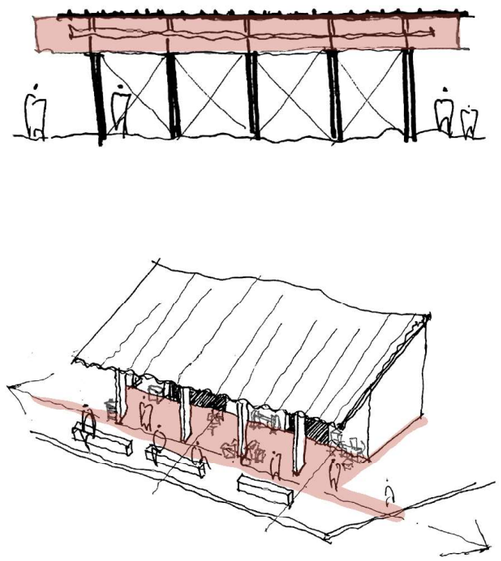


Figure 3.25. Marketplace sketches (Author 2021)

Figure 3.26. Philippi North Station (Google Earth 2021)

Figure 3.27. Phillipi station public square (NM & Associates n.d.)

Figure 3.28. Trading units (Google Maps 2017)

Project: Upcycle Centrum Almere
Architect: Ronald Olthof
Location: Almere
Netherlands
Completion: 2015

The upcycling centre, designed by Ronald Olthof, is located in Almere, Netherlands. The aim of the project was to facilitate processes of waste sorting, upcycling, education and trade, to bring awareness to the field of recycling and circular economy (LKSVDD Architects 2019). The building itself is a model for the possibilities of upcycling, as it was largely constructed and furnished from upcycled materials, including repurposed timber and car tyres (LKSVDD Architects 2019). The building works as a self-contained laboratory that takes waste materials brought in by the public, sorts and distributes them to workshops below the sheltered, public drop-off platform. Upcycling entrepreneurs then transform the materials into new products that are sold back to the public or used to furnish the building (LKSVDD Architects 2019).

According to LKSVDD Architects (2019), the building itself is flexible in that its parts are joined with demountable screws. This lends itself to the notion that adaptable planning was considered for the project. In a waste management centre, the architecture exists as an experiment for the processing and marketing of upcycled materials, which allows for changes in cladding, furnishing and internal organisation. However, the drop off system's design, which uses a ramp to access elevated platforms (LKSVDD Architects 2019), may limit the multifunctionality of the architecture over a longer time period. The unique layout limits the possibilities for functional experimentation and reuse of the internal space, thus challenging the resilience of the project (Ahern 2011:343). While this design decision may be feasible and worthwhile in its given context, Plastic View presents a more critical urban condition that requires greater consideration of a multifunctional architecture.

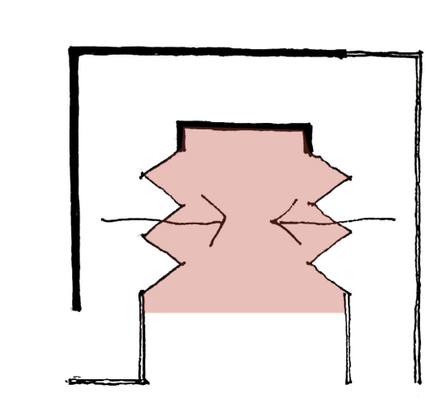


Figure 3.29. Internal organisation sketches (Author 2021)

Figure 3.30. Warehouse exterior (Knipscheer n.d.)

Figure 3.31. Adjacent ablutions (Modulo n.d.)

Conclusion

The three precedents discussed individually embody principles of the "safe-to-fail" system that will be threaded into the design exploration process. The Silindokuhle project and the upcycling centre both express adaptive planning, with the former anticipating function changes and the latter changes of cladding and furnishing. The Silindokuhle project, due to the sensitivity of its context, presents a stronger case for resilience and appropriation. The Philippi project shows how formal intervention can co-exist with the informal activity that preceded it. This understanding of response diversity, particularly within the realm of trading and market activity, is highly pertinent to the dissertation and will reflect in the development of the site.