



CHAPTER

04

DESIGN  
DEVELOPMENT



Figure 4.1. Design process sketch (Author 2021)



## 4.1 INTRODUCTION

This chapter discusses the development of an architectural response to chapter one's issues and intentions and chapter three's site conditions and vision. The design process is guided by the research framework of chapter two and the concept and informants discussed below. The process itself consisted of multiple intuitive and critical workshops, maquette explorations and sketch plan revisions. The iterations arrive at a point from which a deeper technical and material exploration and further design resolution is required.

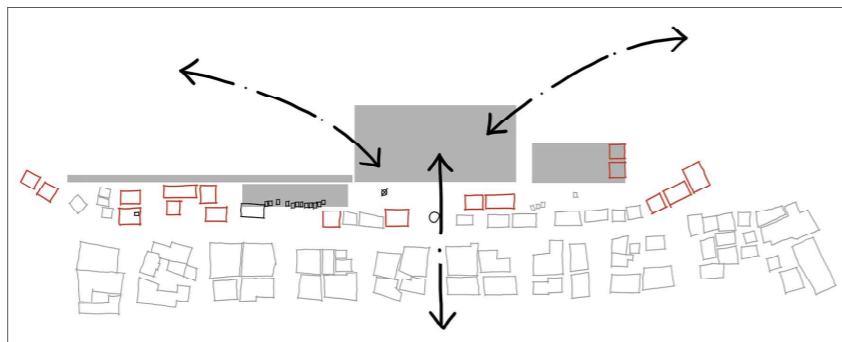
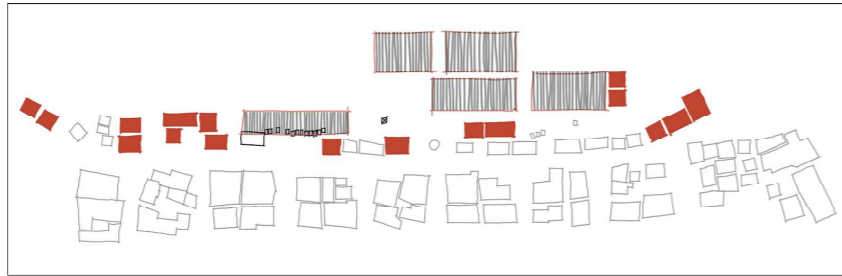


Figure 4.2. Concept diagrams (Author 2021)



## 4.2 CONCEPTUAL APPROACH

The concept draws from the established theoretical and contextual investigations, as well as the anticipated growth stipulated in the site vision. Despite its endurance through forced removals, fire outbreaks and infrastructural deficits, the resilience of Plastic View is impeded by social, financial and political limitations. In overcoming such limitations, the architectural response seeks to facilitate informal upgrading initiatives, promote socio-economic opportunities, and advance current informal trade practices.

The current incremental development of the chosen site can be considered sporadic and cautionary, as new structures attempt to respect the right of way of the street whilst capitalising on open space. Issues become evident in the consumption of already limited open space, as threats of eviction simultaneously put the structures of Plastic View at risk, particularly those that challenge the 'designated' settlement boundary.

The approach responds to the three critical aspects of infrastructure deficit, incremental upgrading and community isolation. As an anchor, the architecture exists along the emerging high street as a core for basic infrastructure otherwise unprovided by the municipality. As a catalyst, the architecture contributes to the activation of the high street through the invitation of social

gathering, spatial appropriation and informal construction. In addition to this, the upcycling programme, in providing alternate construction initiatives, acts as a catalyst for settlement upgrades. Finally, architecture as a connector suggests its ability to counteract the isolation faced by Plastic View through the formation of new networks outside of the settlement. The introduction of the waste management facility extends the network of informal waste collection, whilst connecting Plastic View with the greater, formal construction industry. Responding to the discussed transient nature and speculated expansion of Plastic View, the three aspects must be handled with an abiding consideration for adaptability in the architecture and public spaces.





### 4.3

## DESIGN INFORMANTS

The dissertation looks to the pattern language of Plastic View to inform the architectural intervention by critically observing the settlement's scale, spatial organisation, and visual and structural articulation. According to Alexander (1979:54), the qualities including 'beauty', 'comfort', and 'freedom' can exist not only in environments but also in their inhabitants. It is a relationship where one evokes the qualities in the other, and because of that, environments can be continuously shaped by their users even through expansions and interventions (Dawes & Ostwald 2017:3). In the context of Plastic View, the environment is defined by the identities of the residents as they continuously occupy the space. Thus, looking to the patterns within the environment as informants for the intervention will aid in the continuation of qualities desired by the residents. The critique of the patterns and the proposal of new patterns in structure and space can bring about new qualities that residents may adopt and carry forward (Dawes & Ostwald 2017:3). The patterns are formatted into six layers that range in scale from settlement-wide planning through to material joining. The layers consist of; settlement blocks, to understand plot sizes and growth patterns; streets, to understand their widths and functions; third spaces, to observe rituals, activities and other means of gathering; thresholds, to understand the transitions between public and private, and

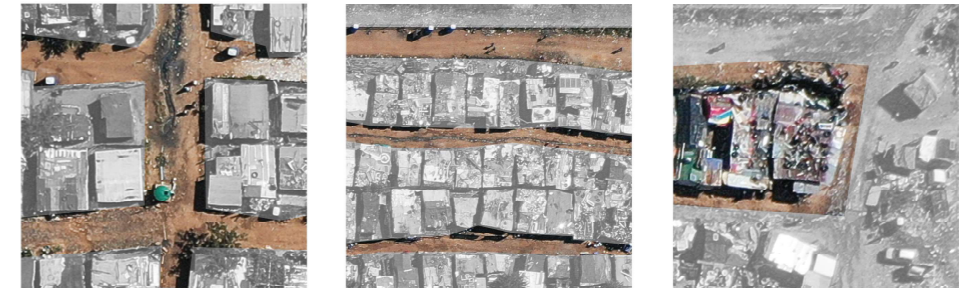
external and internal spaces; private spaces, in the organisation and division within dwellings; and construction, to understand local material preferences, methods and other architectural reasonings. The layer of construction becomes a larger informant in the eventual technical resolutions of the dissertation.

The architectural approach stems from the thorough understanding of Plastic View's complex issues and socio-spatial dynamics, hence the integration and reinterpretation of existing patterns. Various patterns within the layers of settlement blocks, streets and third spaces are unpacked throughout the design process as elements including pedestrian streets, courtyards, and public space are addressed. The discussed concept, regarding both the approach of the anchor, catalyst and connector, and the pattern language informant, are ingrained in the design exploration process.

#### Settlement blocks



#### Streets



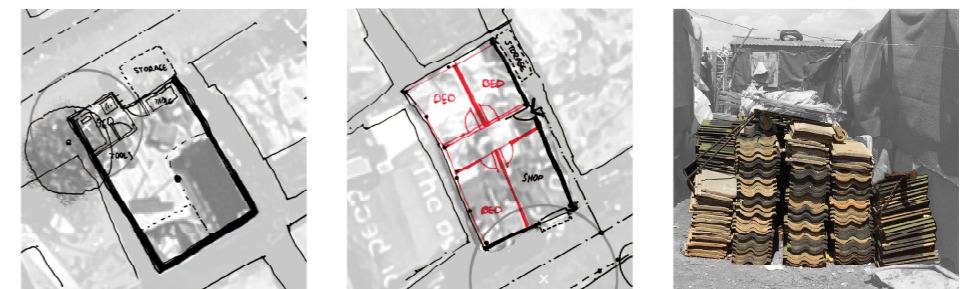
#### Third spaces



#### Thresholds



#### Private spaces



#### Construction



Figure 4.3. Plastic View pattern language (Author 2021)





## 4.4

### DESIGN EXPLORATION

#### Site organisation

Whilst the “string of beads” concept is generally used for city-scale corridors (Warnich & Verster 2005:344), it provided a lens to explore activating the high street by means of developing nodes. Two primary node opportunities were identified; firstly, the main entrance currently occupied by a material trader, barber, kitchen and occasional food traders; and secondly, the area around a water tank rapidly being occupied by new structures. The proposed programmes are organised in relation to the nodes; the marketplace is positioned at the main entrance, responding to the existing trading activity; and the waste management facility is adjacent to the water tank, suggesting a new north-eastern boundary to Plastic View. As incremental growth and infill occurs, additional structures and services along the high street begin to connect the two developed nodes. Public ablutions and live/work units would be distributed in relation to the two nodes along the street.

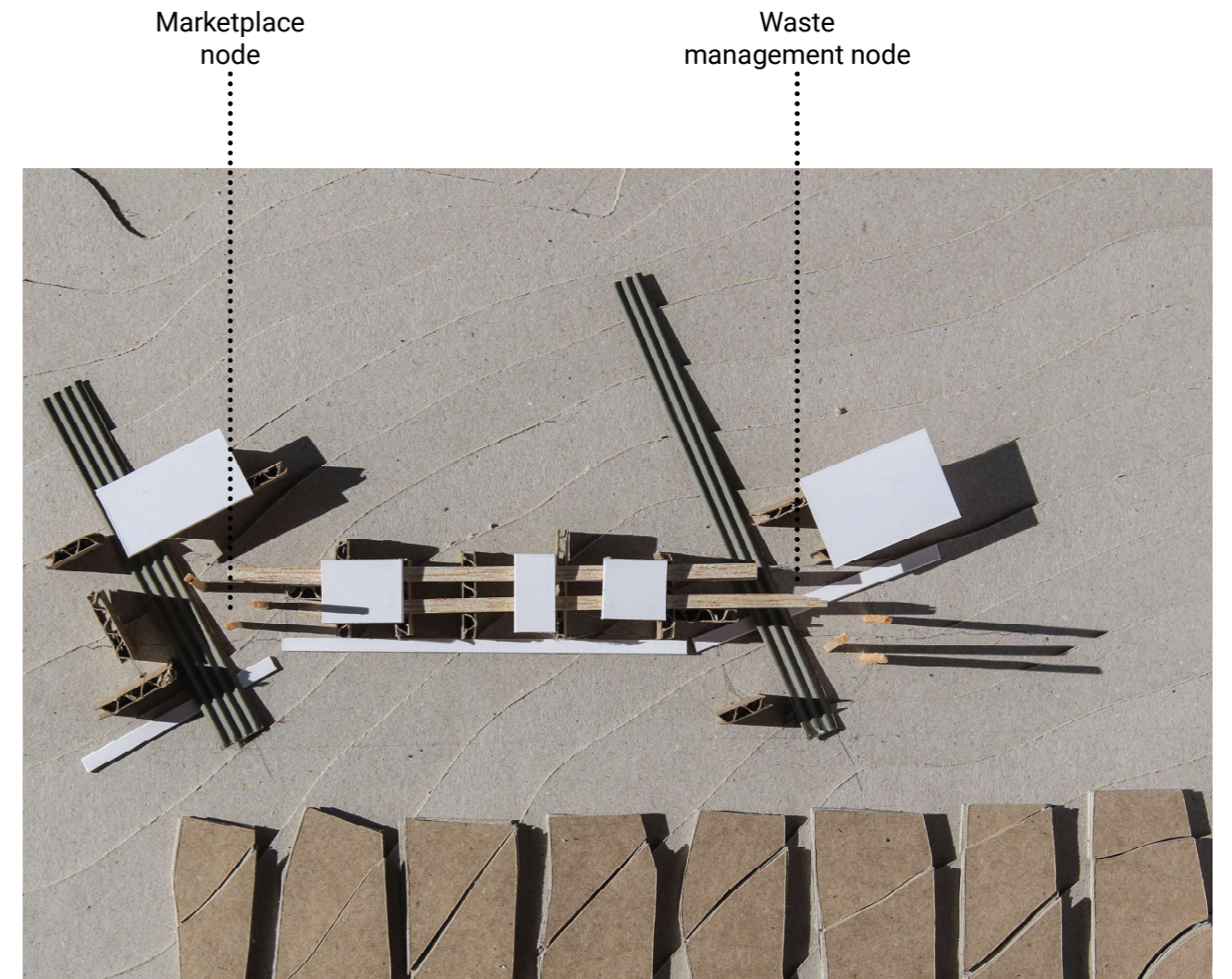


Figure 4.4. Site organisation maquette (Author 2021)



## Massing explorations

The explorations began with responding to the speculated growth of Plastic View. With the expansion of the settlement to the north-east, the road that currently leads to the main entrance of Plastic View should be extended through the settlement parallel to the identified high street. The existing widths of dwelling blocks (10m - 15m) and streets (3m - 5m) highlight an efficient ordering of space. However, the existing occupation of land created the various density issues discussed earlier. These patterns must thus be reinterpreted. The scale of the existing streets in Plastic View allows pedestrian movement to thrive and is therefore maintained in the site development. The scale and proximity of structures however, is reconsidered, with larger structures to accommodate the more complex functions and greater

provision of public space to limit the settlement's density.

The inclusion of the formal thoroughfare lends itself to the intention of forming networks between formal and informal operations, whilst also providing adequate road access currently absent for Plastic View. The formal road, defining the longitudinal edge of the site opposite the high street, also serves as a buffer zone between the existing portion of the settlement and the land upon which the speculated expansion.

Initial drawings failed to respond to the angle at which the settlement is thought to expand. Shifting the structures towards this angle (approximately 25° east of north) simultaneously responds to the angle of expansion and respects the angles of the contours on site. This orientation opens up public spaces along the high street, with courtyards forming at both identified

nodes. Patterns were observed in the presence of courtyards within Plastic View. When positioned internally between dwellings, they allow for private gathering, and when made as extensions from the spatially-limited streets, they encourage social and functional gathering.

Despite the intention of creating architecture that plays a catalytic role in incremental development and upgrading, a challenge was noted in the introduction of public space. Public space, at a scale greater than the intimate thresholds along streets, is scarce in Plastic View as dwellings are conceived as more beneficial uses of the limited land available. In light of this pattern of occupation, the public space of the intervention will require an articulation of public furniture, vegetation and functional use that shows the community the value such spaces can provide. This, in turn, will

prevent residents from erecting additional structures in the open spaces to the extent that it would overload the density of the site and incite fire hazards, movement restrictions and other threats to public health.

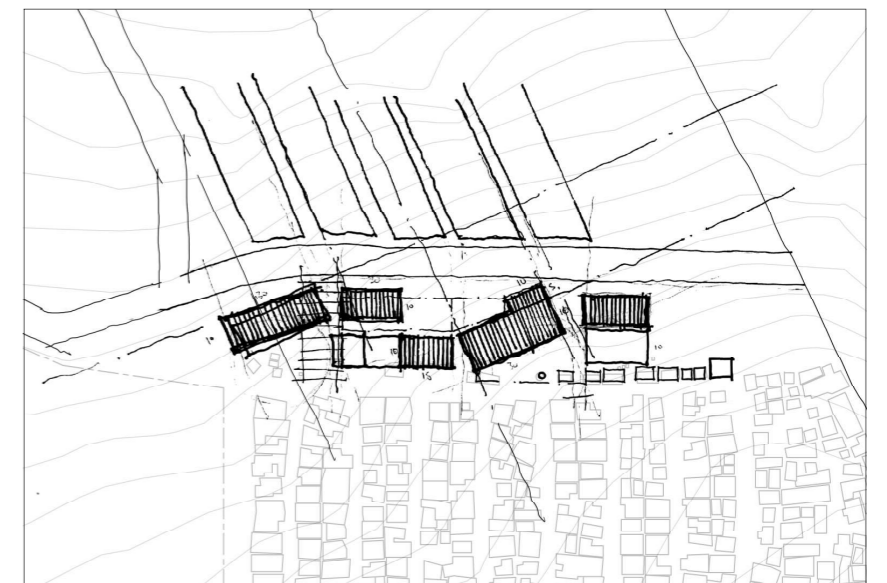
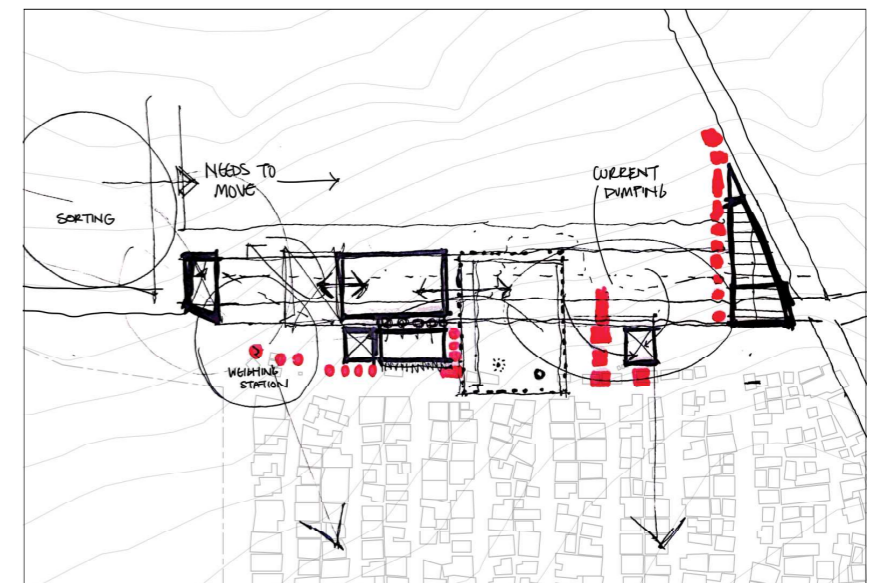
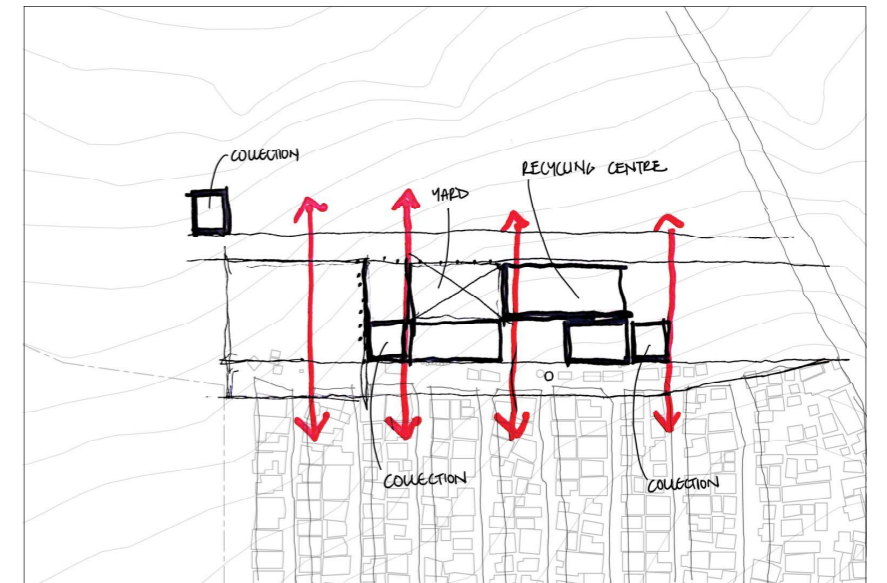


Figure 4.5. Site explorations (Author 2021)



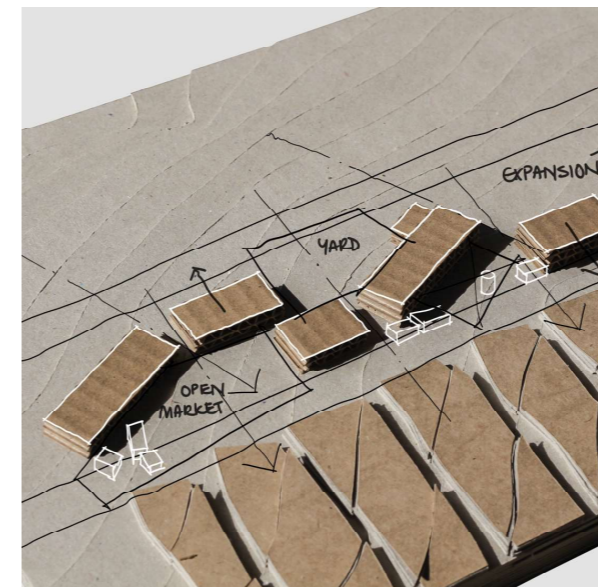
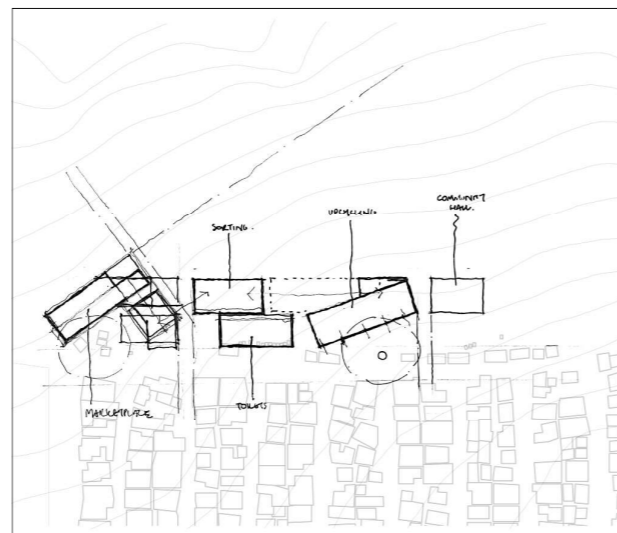
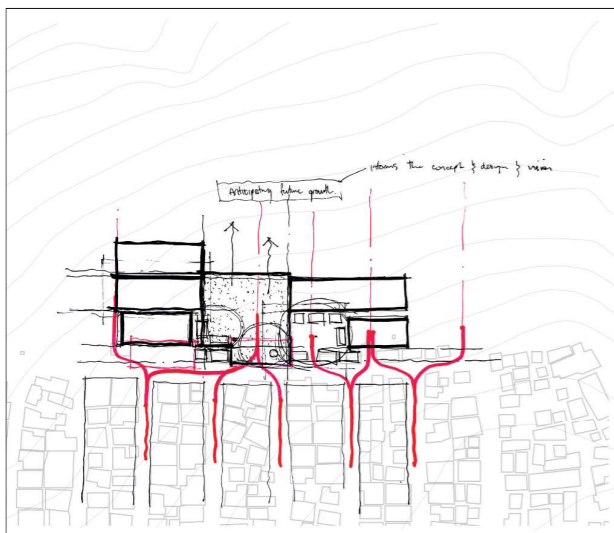
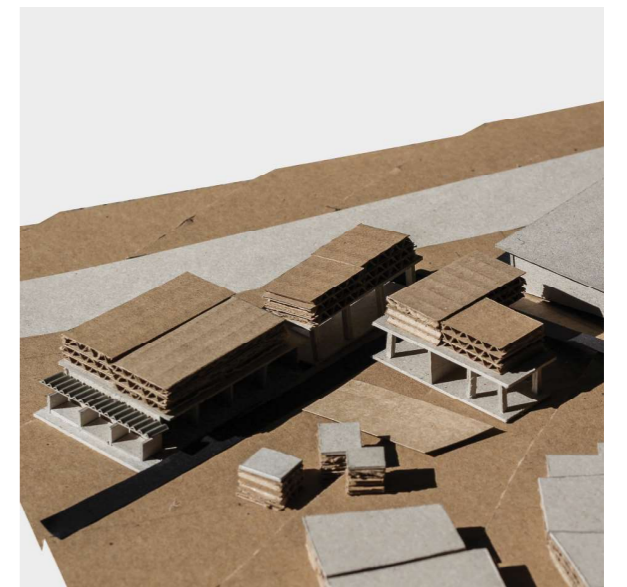
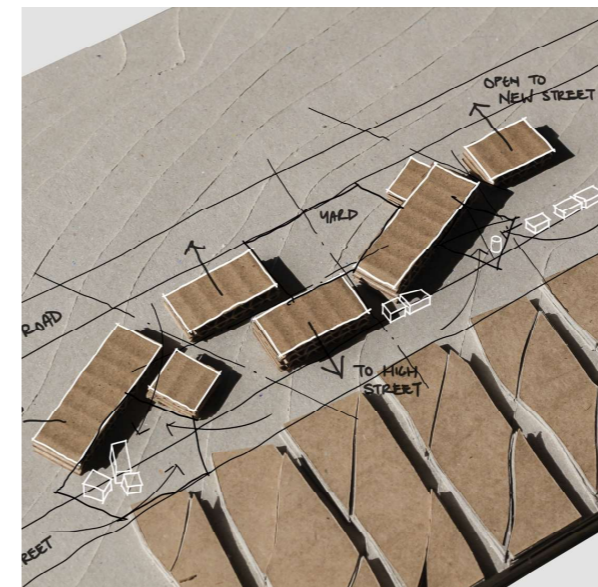
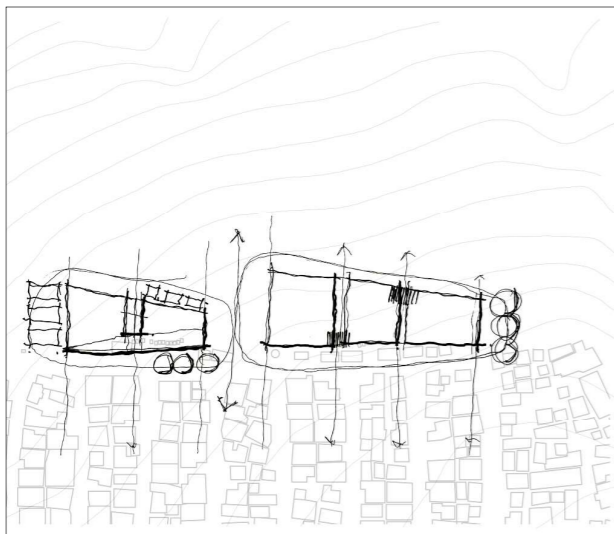
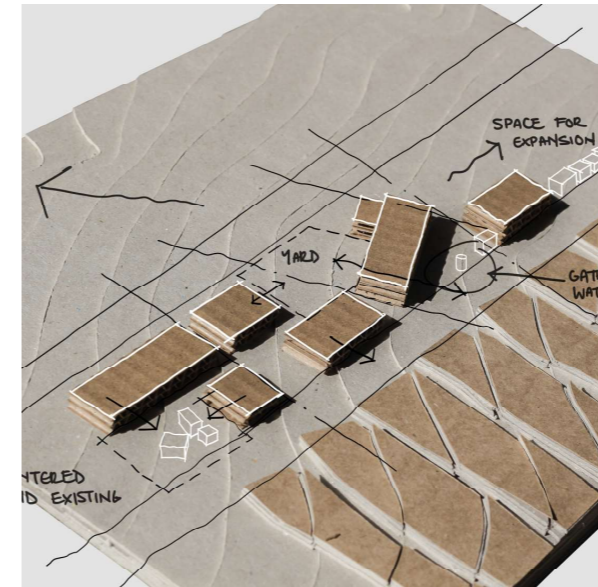
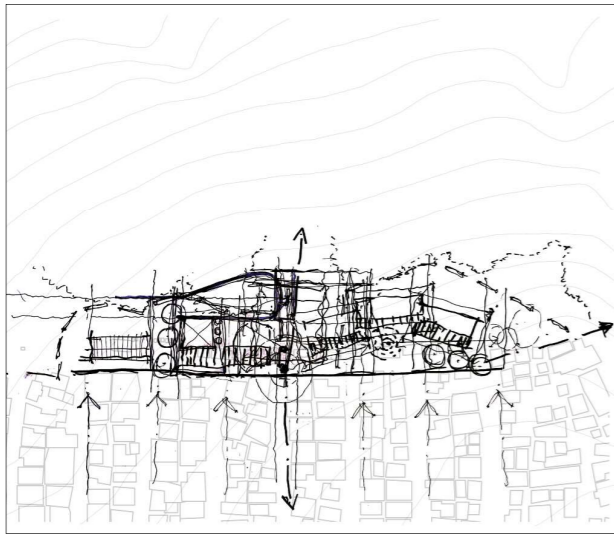


Figure 4.6. Site explorations (Author 2021)

Figure 4.7. Maquette explorations (Author 2021)



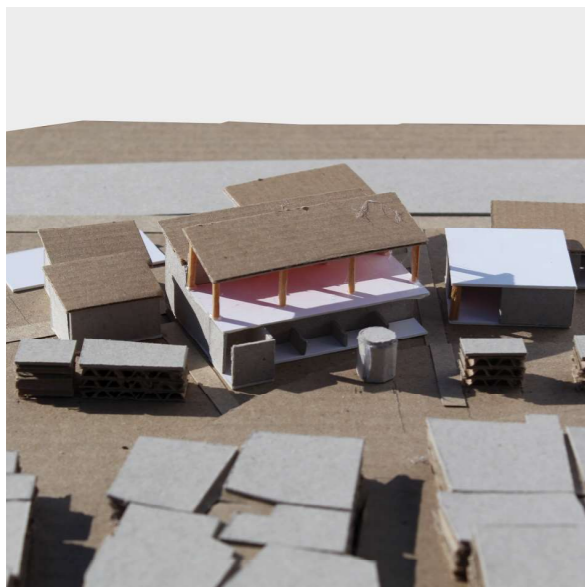
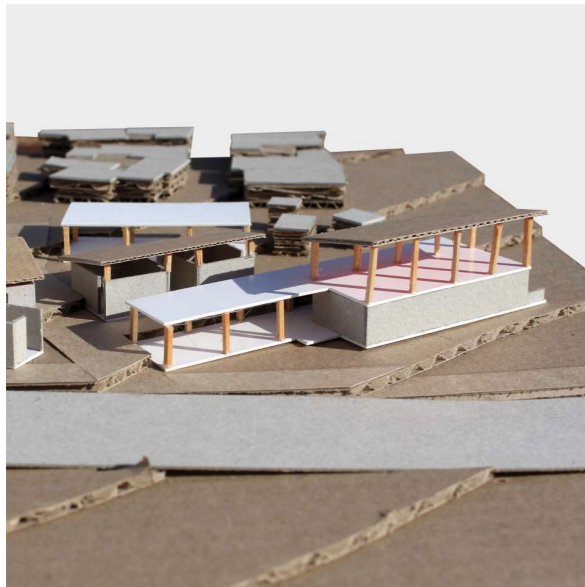


Figure 4.8. Maquette explorations (Author 2021)

The explorations appropriately respond to the speculated large-scale expansion of Plastic View; however, it still needs to address the changes in community dynamics that will come with the expansion. As discussed in the site vision, consideration must be given to the changing needs and desires of the Plastic View community, be that in the reinvention of spaces for different functions or the physical adaptation of the architectural elements that define those spaces. There is value in exploring how a shift in the settlement's adaptive cycle may affect the site and create opportunities for further growth and service provision through municipal involvement.

Whilst analysing the pattern language of Plastic View has led to a reinterpreted, appropriate scaling of the site, as the design iterations continue, further response to the language at its various levels is needed. The threshold typologies of the settlement will inform the complexity of design along the high street, and the use of critically limited space will inform the multifunctionality of structures. As the design of more intimate spaces like internal rooms and courtyards hasn't been articulated yet, the massing scale seems to overpower that of the existing dwellings; however, through the iterative process they will be appropriately distributed around the nodes.



## 4.5 DESIGN ITERATION

The design explorations discussed in chapter two were limited to investigating the programmatic requirements, massing and pedestrian movement of the intended development, in response to the outlined programmes and concept. Drawing from the "string of beads" concept (Warnich & Verster 2005:344) and "safe-to-fail" systems thinking (Ahern 2011), the explorations culminated in a grounded understanding of a proposed organisation and hierarchy of the selected site. The design iterations build on the research intentions discussed in chapter one, specifically addressing the various branches of infrastructure and the elements that contribute towards the "safe-to-fail" system. The public realm within the site development will be informed by the literature of Jan Gehl, particularly the book "Life between buildings: Using public space" (Gehl 2011). From this comes a thorough exploration of public space, thresholds and services, as well as themes of incrementality and the balance between existing informality and the proposed formal construction. The iterations, however, highlight a greater acknowledgement of public space, incrementality and the thresholds between the existing informality and the proposed formal construction.

## Iteration one

The first iteration explored the spatial implications that came with organising programmes around the two identified nodes along the street. Responding to the existing business practices at the entrance to the site, the proposed market hub is positioned at this entrance, capturing the heavy foot traffic of this area of Plastic View. The market consists of lock-up units that provide more permanent occupation for trade and an open marketplace that caters for the transient nature of informal trading. This response diversity is similar to that of the Philippi public transport interchange, lending to a notion of a “safe-to-fail” system (Ahern 2011:342). Further up the street, the waste management hub is stepped back from the existing path to define a courtyard space between it and the existing water tank. The iteration proposed a

formal road that, together with the existing street running parallel, defines the longitudinal boundaries of the site. Consideration was made for movement between the existing street and the proposed road, which aided in decreasing the scale of masses and distributing them along the site.

### Critique

Iteration one failed to successfully occupy the selected site in two manners. Firstly, there is a disconnect between the proposed structures and the high street. Instead of opening up directly onto the street, the structures are stepped back, forcing pedestrians to move off the street into the isolated hubs. This ignored the conceptual approach of architecture as a catalyst for third space activity along the high street and instead created an internal organisation rather than an external one. Photographic documentation in Plastic View, as outlined

in the research intentions of chapter one, shows patterns of social interactions and activities occurring primarily on the streets, where the streets become third spaces extending out from the privacy of dwellings. This understanding must be reflected in the treatment of the edge condition along the high street. Secondly, whilst the plan speaks to two nodes along the street with multiple structures defining the nodes, there lies an issue in the linking of the market hub and waste management hub. The “string of beads” approach to development not only necessitates nodes along a corridor, but also structure and opportunity for activity between such nodes (Warnich & Verster 2005:344). Both nodes express concern for internal movement along pathways; however,, there lacks exploration between the two in how they connect and how they might read as a holistic development along the site.

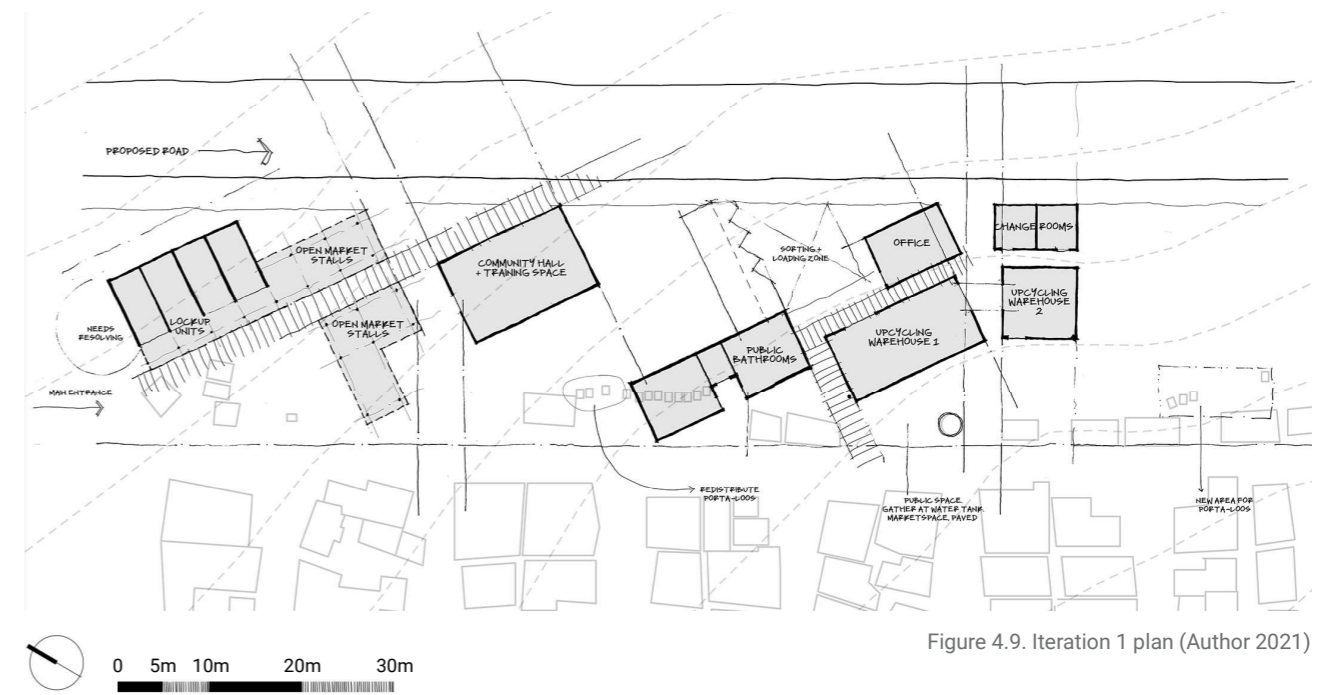


Figure 4.9. Iteration 1 plan (Author 2021)

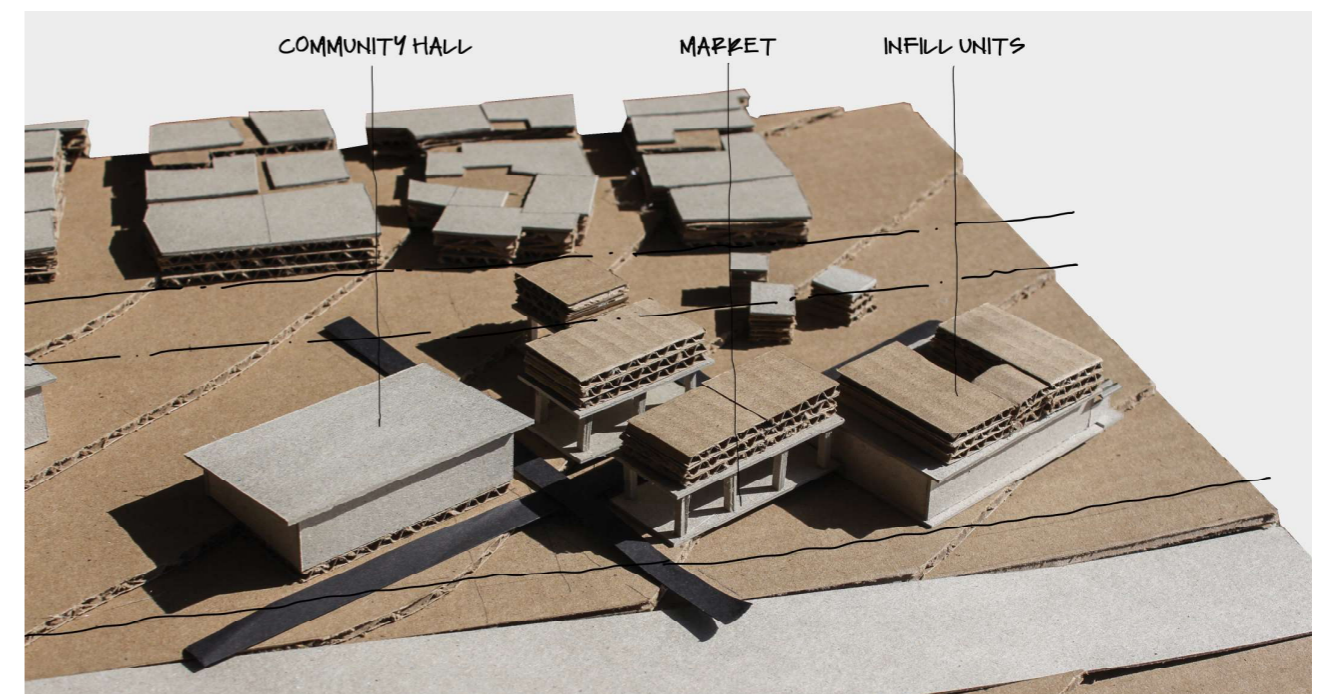


Figure 4.10. Iteration 1 maquette (Author 2021)

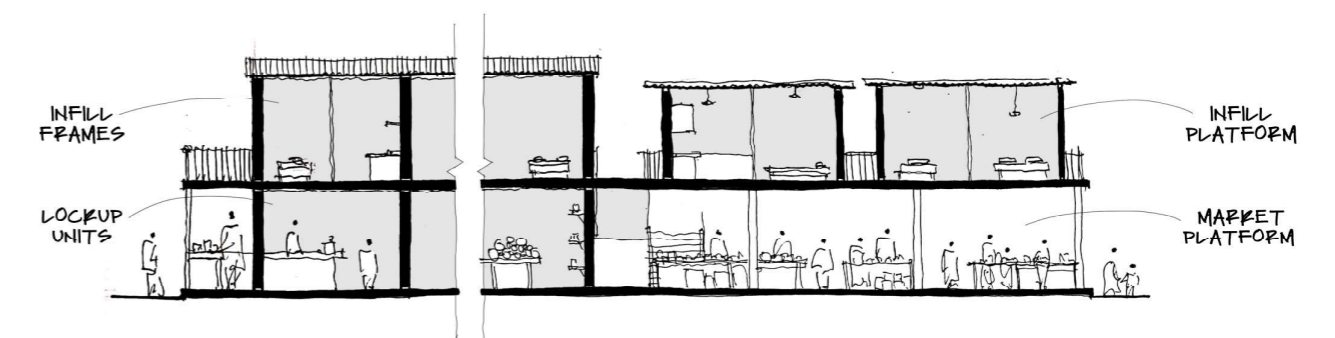


Figure 4.11. Iteration 1 market section (Author 2021)



## Iteration two

The second iteration responded to the critiques made for iteration one, particularly concerning the edge condition of the high street. Live/work units were conceived along the street edge as a solution to both previous critiques. The units open onto the street in service of the present informal economy, and as a result of their central positioning, begin to stitch the two identified nodes together. In addition to the live/work units, residential space was introduced above the marketplace and factory structures in the form of open building systems. According to Walker and Salt (2006:121), a greater variety of responses to threats creates a stronger internal resilience against disturbance. Hence the decision to design a diverse set of economic platforms, with lock-up stores, the marketplace and live/work units, and a diverse range of residential opportunities for

Plastic View. The collected data on household floor plans showed that residents continuously alter and repurpose rooms within their dwellings to suit their financial needs and family dynamics. As expressed in iteration two, open building systems imply an incremental infill construction process that caters for the financial instability and alternating needs of the Plastic View community. This begins to articulate the notion, discussed in chapter one, of enablement over provision as part of the architectural service (Combrinck et al. 2017:34). Positioning the residential spaces above other functions was a response to the concern of density within Plastic View. The design and construction of multi-storey dwellings is a critical facet of technical knowledge that is transferred during the development. This sharing of knowledge is ideally reflected in the incremental upgrading of the settlement, as residents

see the formal construction methods as guidance and inspiration for informal construction.

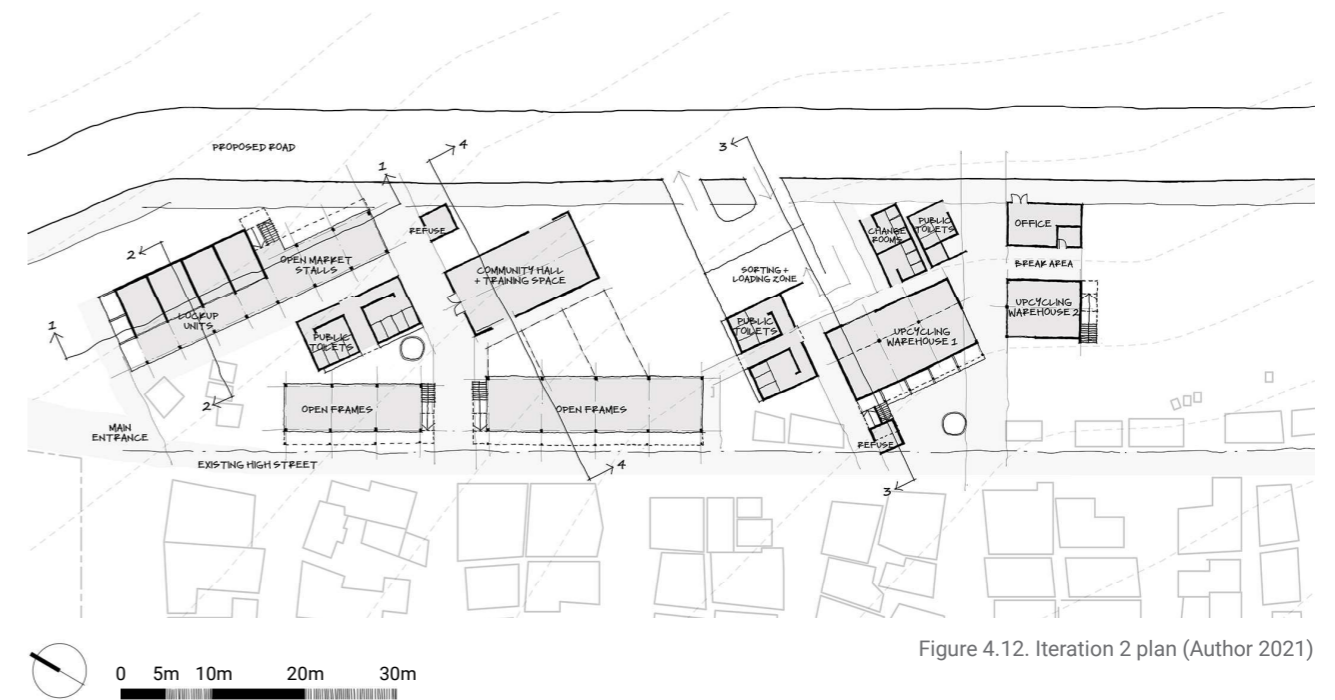


Figure 4.12. Iteration 2 plan (Author 2021)

## Critique

The iteration brought forward important design considerations, such as the open building system; however, it was not spatially and technically resolved. The resolution of this system will come in the technical development of the dissertation as the structures and materials are deeper explored. Iteration two included a distribution of public ablutions (as opposed to a centralised ablution facility) that aligns with Ahern's (2011:342) argument that a system with decentralised entities creates a redundancy that mitigates the risk of failure. However, the ablutions within the market hub block a potential public courtyard

from forming, so their position should be reconsidered. The other concern with the iteration is the orientation of the structures, which was primarily dependent on the angle at which the speculated expansion of Plastic View was to occur. At an angle of 25° east of north, the structures would face a more harsh morning sun as opposed to ideal midday sun that comes with north-facing structures. The design required a reconsideration of orientation that would make a more favourable balance between climate-informed and context-informed orientation.

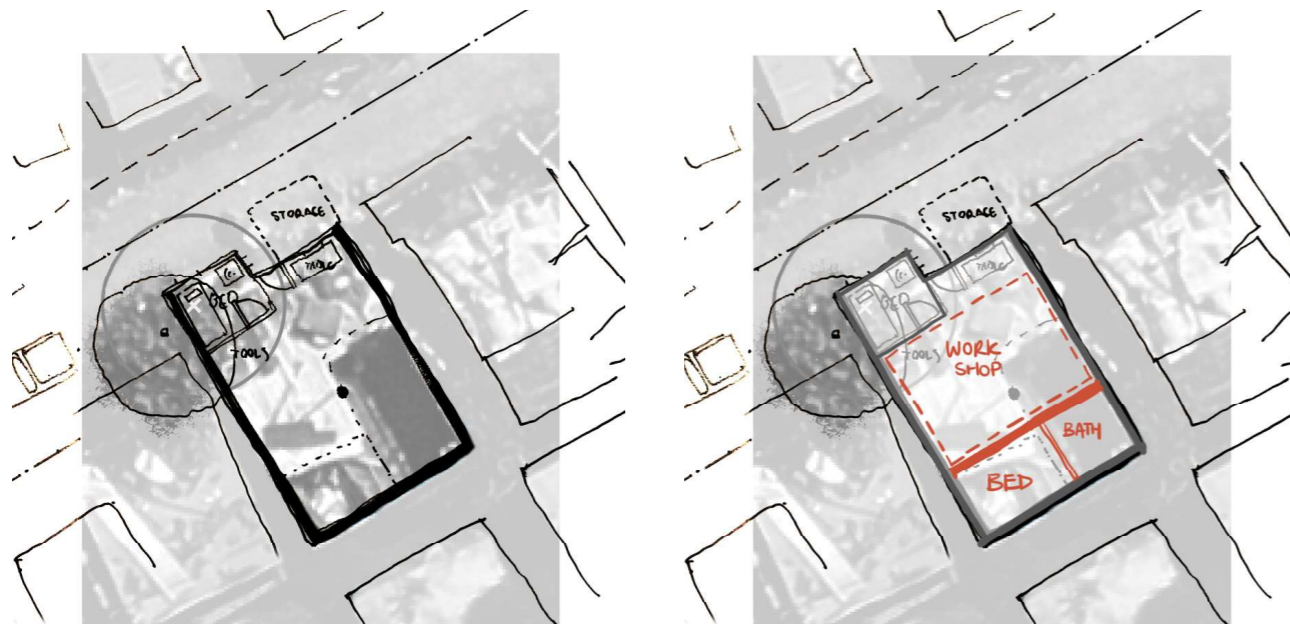


Figure 4.13. Speculated household interior changes (MPIP 2021)

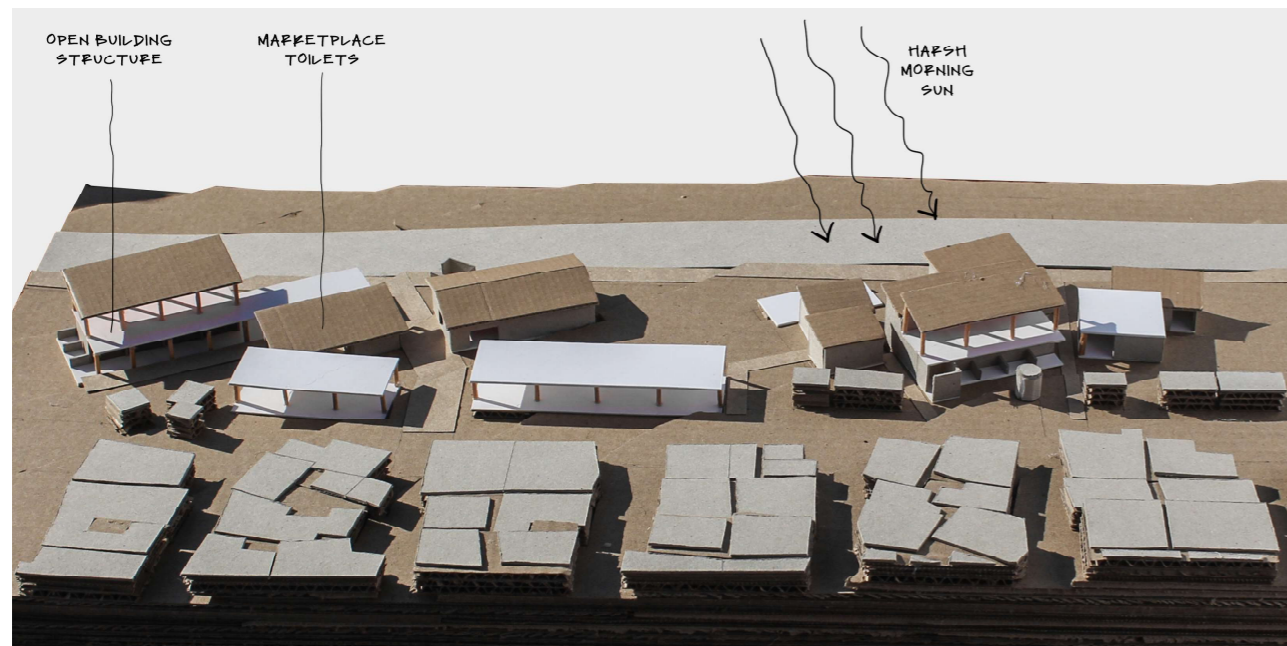


Figure 4.14. Iteration 2 maquette (Author 2021)

### Iteration three

The third iteration sought to rethink the orientation issues of iteration two by rotating to a north-facing design. This had spatial implications on the movement between structures, their threshold conditions and the framing of public spaces along the site. Pathways subdivide both nodes, creating opportunities for the third space interactions observed within the settlement, as structures can open up to the internal pathways and external public spaces.

The marketplace and community hall were positioned to frame a public square extending from the street. The square provided a flexible space for large outdoor community gatherings, an additional safe playing area for children and an extension of the marketplace for increased trading activity and events. In this sense, it aligns with Gehl's

understanding of catering for three types of outdoor activities (Gehl 2011:9).

A large public area was created between the two nodes as a green space within the site development with this iteration. Currently, Plastic View has one large field on the opposite end of the settlement at which children and adults convene to play sports. Whilst providing the settlement with additional playground space, the proposed green space becomes increasingly important with the anticipated expansion of Plastic View. Should the settlement grow beyond the high street, the proposed development reestablishes itself as a central buffer between the existing and new portions of the settlement. The central green space becomes a valuable point of gathering.

Smaller public spaces were established within the waste management hub, as it became a self-contained

entity within the greater site development. The plastic brick factory was stepped back from the existing water tank to provide a public space around it. The current conditions at the water tanks in Plastic View are problematic due to poor drainage that leads to waterlogged streets. As a result, little ownership is taken of these active spaces that have the potential to be coveted points of gathering, be it for socialising or trading. According to Gehl (2011:33), optional activities thrive where physical conditions are of a higher quality. By designing more considerate spaces around the water tanks, with adequate drainage, shading and seating, they can become more substantial points of attraction within Plastic View.



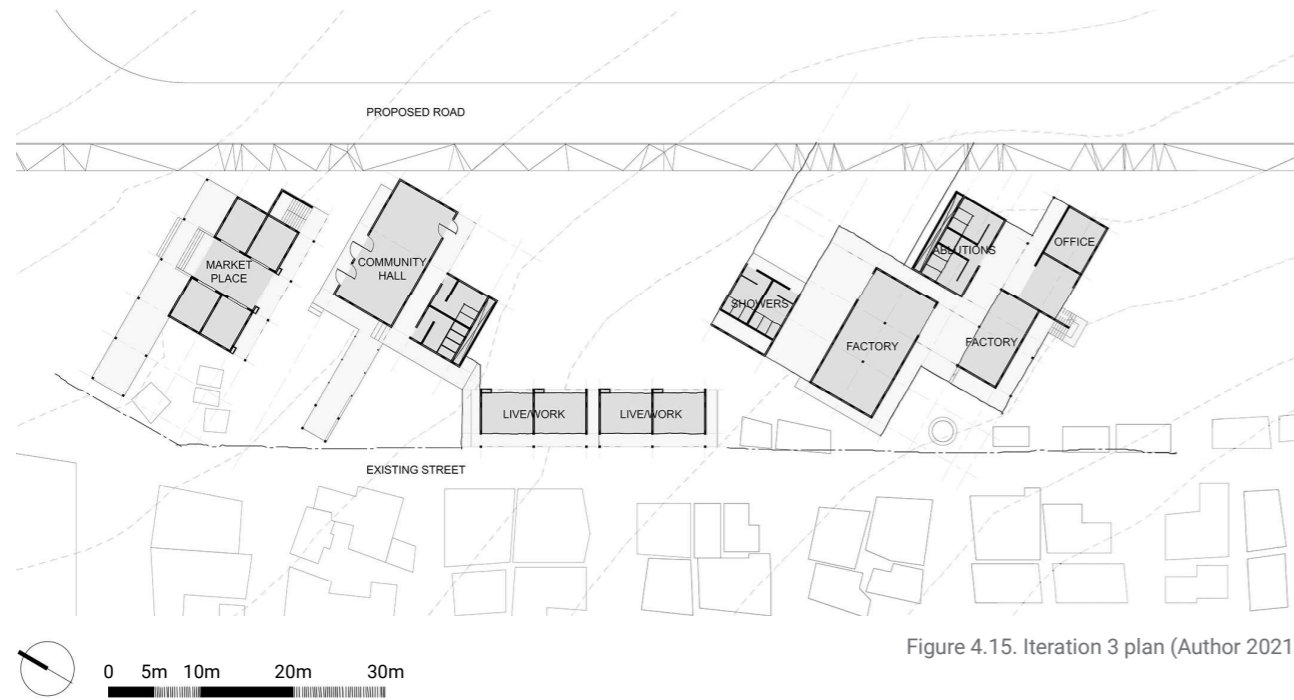


Figure 4.15. Iteration 3 plan (Author 2021)

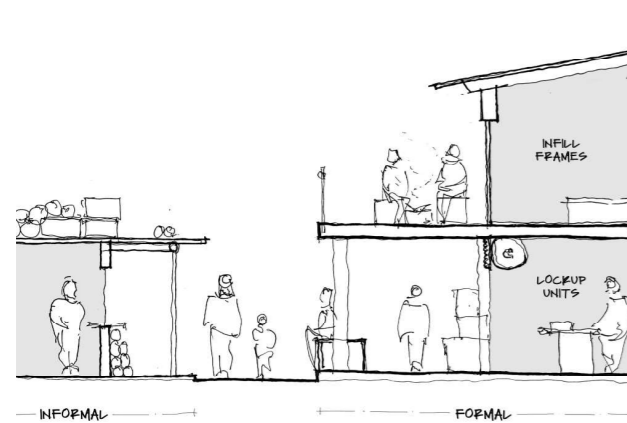


Figure 4.16. Marketplace section (Author 2021)

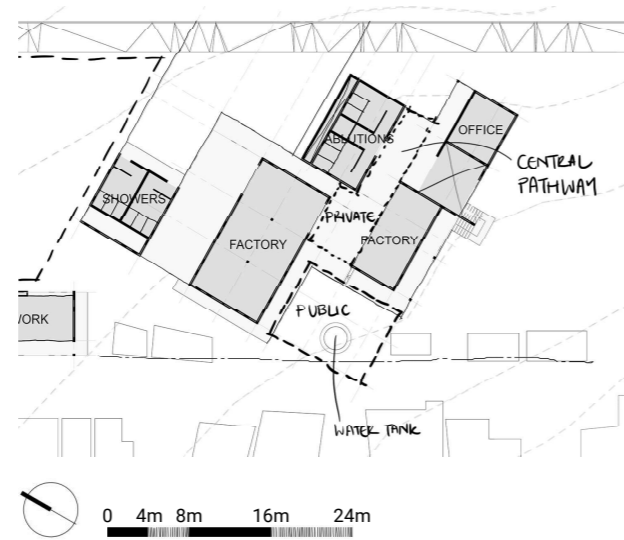


Figure 4.17. Iteration 3 waste management facility plan (Author 2021)

### Critique

Despite a greater consideration for the public spaces and thresholds between structures, iteration three lacked a deeper exploration and resolution of these spaces and how elements including vegetation and street furniture articulate them. Public spaces, primarily along the streets, in Plastic View serve specific purposes depending on the elements that make up the spaces. For example, trees and chairs create shaded places for seating; and dwellings or screens subsequently dictate the level of privacy of those places. The public spaces proposed in the design require a consideration of how the spaces would traditionally, or could potentially, be used by the community to aid in articulating the spaces. The spatial planning on behalf of the architect can directly affect the possibility of social activity (Gehl 2011:13). This can assist in articulating a variation between the two

larger public spaces proposed in this iteration, because initially they read as undefined, buffer zones around structures that lack a sense of hierarchy between the two.

The iteration also began to explore the spaces that form the waste management hub; however, it lacks clarification on the transitions between public and private spaces. The central pathway suggests a thoroughfare for the general public to move between the proposed road and the existing street. However, this could raise security issues in the factory and comfort in moving through the space.

## Iteration four

The fourth design iteration sought to address the critiques of the previous iterations whilst stepping back and reconsidering how the public move towards and through the site. The scale of the two larger public spaces from iteration three was reconceived as the larger, central green space and a smaller courtyard in between the community hall and public ablutions. Covered walkways begin to articulate the thresholds between public and private, and inside and outside spaces, particularly for the live/work units along the high street. The waste management hub was reworked to have a private courtyard framed by the factory, ablutions and office. The public space for the water tank was resolved with shading and space for trading both outwards to the public space and inwards to the private courtyard for the factory workers. The market

space was reimaged at the northern corner of the site, visually exposed to the proposed road and opposite the proposed taxi rank. With the early morning and late afternoon flux of employed residents, the marketplace becomes an easily accessible place to purchase food and supplies. Currently, an informal market operates on weekends along the road that leads to the entrance of Plastic View. With the proposal of a taxi rank in the place of the informal market, the weekend trading activity is moved to the covered marketplace and the trading stalls adjacent to it.

The other focus of iteration four was to explore how the anticipation of adaptation manifests in the design. Combrinck, Vosloo and Osman (2017:34) argue that informal settlements can allow residents to create and alter dwellings with an authority that formal construction operations tend

to lack. Thus, iteration four explored how the proposed intervention could continue this authority. Drawing from the observed popular use of eucalyptus (gum) poles as structural elements within the settlement, eucalyptus poles became the informant for a language of flexible systems that aid in defining both public and private spaces. The systems are evident in the shading devices of the waste management hub and the outdoor extension of the community hall, allowing additions of shading, seating and enclosing. Timber provides for increments of change, such as attachment and replacement (Kamalipour & Dovey 2020:3), because of the versatility and modularity the material affords.



Figure 4.18. Iteration 4 plan (Author 2021)

### Critique

Whilst the iteration begins to explore the flexible systems within the design, it lacks a resolved understanding of them. So, during the process of refinement of structures and materials, the full extent of the adaptability of the proposed intervention must be resolved. The residential, trading, and live/work units were designed with internal spaces derived from the observations of existing Plastic View dwellings.

However, deeper analysis and speculation on the possible internal variations for these spaces is required. This may inform a more profound catering for adaptability in the structures.

Although the design includes greater consideration for public spaces than previous iterations, there lacks an articulation on how the community would appropriate these spaces over time. As stated in the project intention

of incremental servicing, a degree of adaptation must be anticipated. Thus, the articulation of spatial appropriation is necessary for visualising the intended adaptations and defending the design decisions made for these to occur.



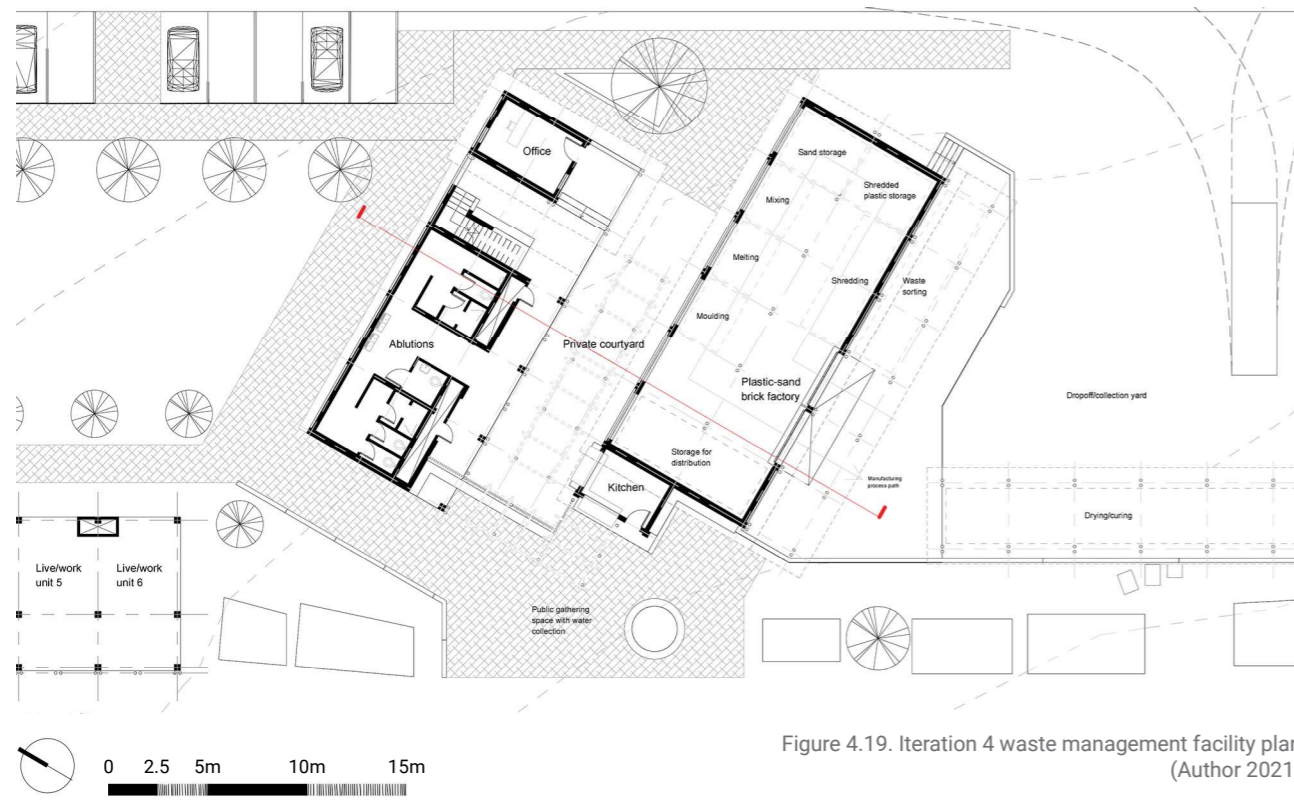


Figure 4.19. Iteration 4 waste management facility plan (Author 2021)

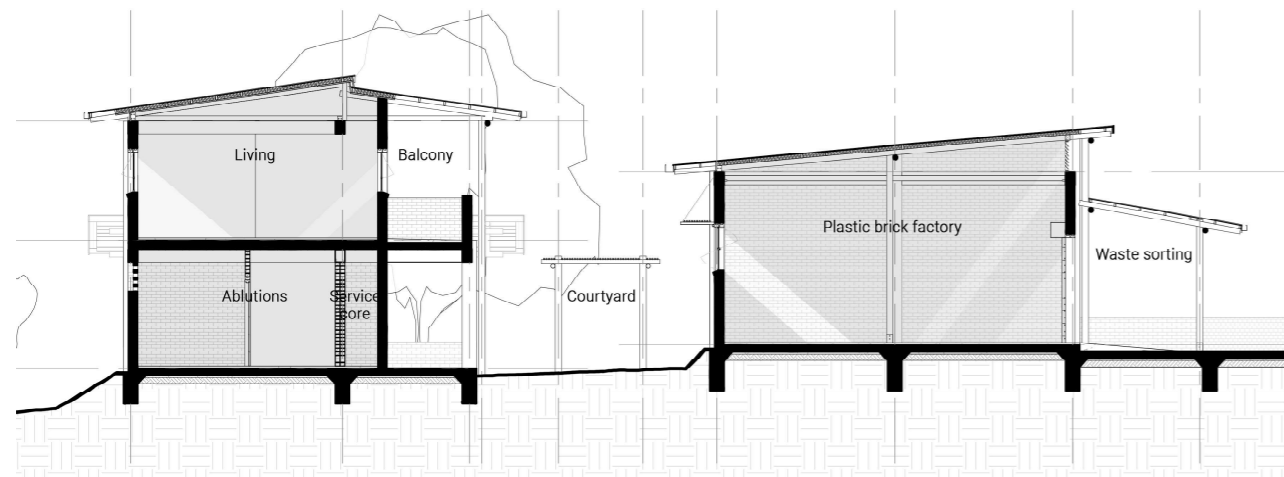


Figure 4.20. Iteration 4 waste management facility section (Author 2021)