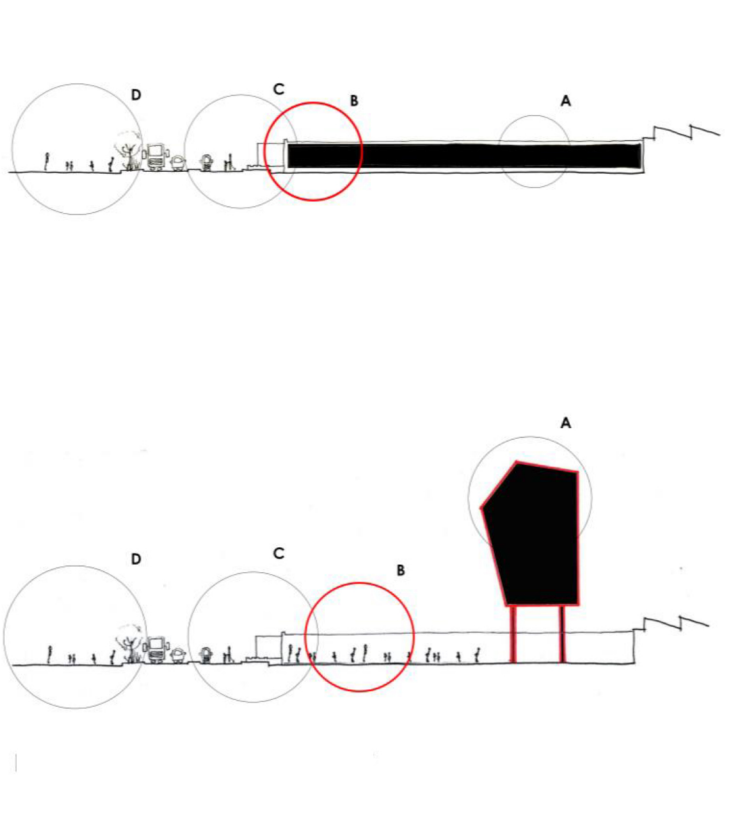
TEARING THE ENVELOPE:

FROM TUNNEL TO TOWER INDUSTRIAL TYPOLOGY



Ivor Saville

Master of Architecture (Professional)
DESIGN DISSERTATION REPORT
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UNIVERSITY OF CAPE TOWN – FACULTY OF EBE – SCHOOL OF ARCHITECTURE PLANNING + GEOMATICS

TEARING THE ENVELOPE:

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Stella Papanicolaou
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This dissertation is presented as part fulfilment of the degree of Master of Architecture (Professional) in the School of Architecture, Planning and Geomatics, University of Cape Town
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ACKNOWLEDGEMENTS

To the stakeholders - Mercy Brown-Luthango (African Centre for Cities), Jaqueline Burge (Rarity Handbags), Marijke Hingston (Woodheads), Wade Skinner (Wolf and Maiden) and Wesley Nel (Dynamic Africa) – for taking the time to share your field knowledge with me.

To my supervisors Stella Papanicolaou and Mike Louw, thank you for the committed effort to wrestling the delivery of this project.

To my mentor, Anees Arnold, for 5 years of inspiration guidance.

To my friends and Family, for love and support in this year, and the 5 years prior.

Mom, for the love, wisdom, and devotion to our success.

Marco, for setting the bar.

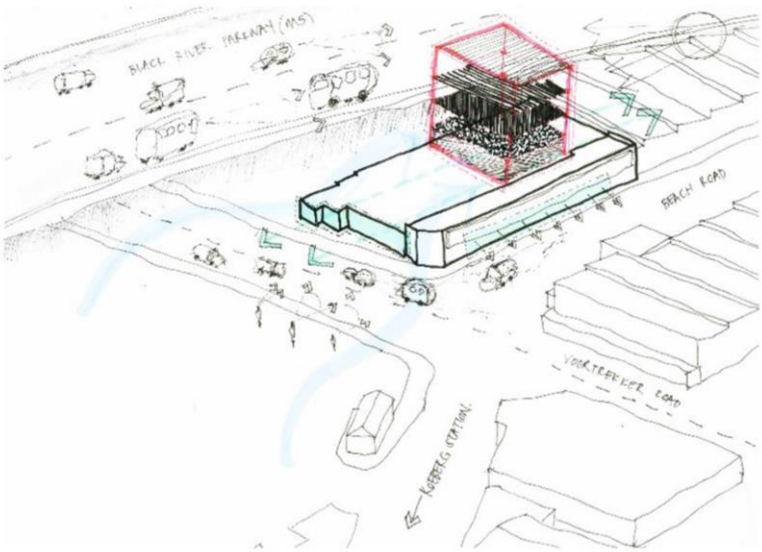
Danielle, for dreaming and believing.

To my nephew Noah, I hope this inspires you.

ABSTRACT

The following dissertation responds to the industrially significant Maitland/Salt River area of Cape Town, Western Cape. Over time, industrial stock has resulted in ruin due to the unpredictable reality of industry, and competing for business globally. Exploring the possibility of the area to be developed as an industrially significant urban quarter seeks to revive investment in existing industry. The revival requires a shift in business and architectural model that encourages adaptability through rethinking the scale of production/manufacture and tenancy. Current single tenancy models operate with a ground floor sprawling line of production, prioritising the machine in a controlled environment. This requires a rigid form of enclosure, defined in this research as the envelope. Research has suggested that the scale of manufacture should decrease, providing the opportunity of a hybrid, mixed-use industrial typology. The intention is to vacate space on an industrial site to cater for an interface with the public. Visual and physical connections with the local urban condition will allow the factory to contribute to the revived intention of industrial urbanism in the area. The Jensen Belts leather factory will be used as this study's existing building to be adapted. Currently the circulation of production and goods is isolated from the circulation of the public which results in the factory creating a black box surrounded by negative space in the city. Prioritising the circulation of goods creates an environment that is not conducive to human comfort – highlighting the sheltering priority of the existing factory, to house goods and not people. Focusing specifically on leather production, rethinking the connection between the circulation of goods and people establishes the industrially significant presence through the theatre of production in the city.

The proposal of a future factory lies in rethinking the production line model to limit the amount of space it occupies – offering loose space for multiple tenancy. Multiple tenancy describes the hybrid typology proposed to cater for the varying needs of the Maitland context. These needs involve employment and upskilling, which are catered for in a responding Community Workshop Model. The first architectural investigation seeks to 'tear' the tightly sealed factory building envelope once the controlled production line model shifts. The second architectural enquiry is in the design of an adaptable vertical tower that houses the possible phases of needs in the typical industrial building life cycle. The tower is seen to anchor a hybrid community workshop program. The existing building and site constraints, tunnelling the production process, provides a platform to propose a strategy for a new, bold structure that shifts the program to prioritise the comfort of the user. In response to the existing controlled production line model that excludes the public, the new model seeks to expose the program to connect to the site's range of urban networks positively. The area offers a wealth of key infrastructural networks (M5 highway underpass, railway, Black River, West end of Voortrekker Road) that have resulted in spatial boundaries. With the interest of 'tearing' the factory building envelope for integration, the urban investigation seeks to establish ways of inhabiting and crossing these architectural and urban boundaries to foster connection.



[1] Diagram illustrating vertical urban factory proposal

[2] The iconic corner of the Jensen Belts factory, facing the new Capita Building – the office building which replaced the Prestige clothing factory, resembling an industrially significant saw-tooth roof.

GLOSSARY OF TERMS

ADAPTIVE RE-USE – The process of design that establishes a new purpose for an existing building or structure.

CAPACITY – A spatial configuration explored through an arrangement of objects to determine a function.

CONNECTION – Establishing a relationship between the building and surrounding urban environment.

CULTURALIST – Focus of the identity and operation of people, prioritising needs as an informant of architectural form.

ENCLOSURE – Boundary system that frames the occupation of space, it determines the relationship from one space to another.

ENVELOPE – A metaphor describing the building enclosure system.

ERGONOMIC – Designing for efficiency and comfort in the working environment.

EVERYDAY – The unique societal conditions of a particular context.

HIERARCHY – A system of layers providing an order to establish an arrangement or organization.

HYBRID – Of mixed character; composed of different elements.

INFRASTRUCTURE – A system providing connections of various types.

INTEGRATED PRODUCTION – Single tenancy company producing in a vertically organised production line running from top to bottom.

LAYERING – Separating a horizontal program and stacking the parts, one above the other.

LONG-RUN PRODUCTION – A process of manufacture that involves heavy machinery in a network that occupies a large amount of space.

MODULAR – An anthropometric scaled system which prioritises the user through an understanding of proportions.

NEGATIVE SPACE – Inactive, unoccupied space resulting in issues of safety and desirability.

NETWORK – The linking of buildings and spaces to create a continuous urban condition.

PERMEABILITY – Describing the ability of a material to allow movement through it.

POSITIVE SPACE – Space encouraging interaction of people and the urban realm.

PREFABRICATION – The manufacture of separate or complete pod components in a controlled, off-site environment. Separate components can be assembled on-site, while complete pods are delivered and placed in position with a crane.

PRODUCTION – The process of goods manufacturing.

PROGRESSIST – An architectural model of influence based on principles of standardization, functionalism, purification, rationalization and openness.

SERVED SPACE – The habitable, comfortable spaces of a building.

SERVANT SPACE – Spaces that contain the functional, services of a building.

SHORT-RUN PRODUCTION – A production process that involves small or no machinery, largely hand crafted, to create a network that is short, and interactive with the public.

TERRITORY – A tool of physical organization to establish control.

LIST OF ABBREVIATIONS

ACC – African Centre for Cities

TRUP – Two Rivers Urban Park

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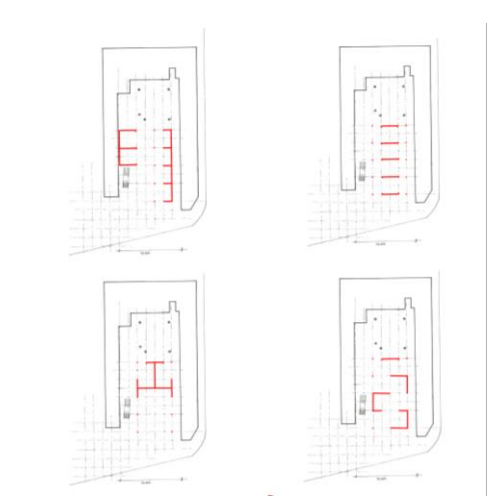
INTRODUCTION

The Salt River area in Cape Town shows evidence of industrial stock in ruin, making the area undesirable and unsafe. For the industrial operations to survive and influence quality public space, factories need to adapt to the changing requirements of social, production and retail needs. Generally, the life cycle of a factory building results in redundancy when the space a building offers cannot accommodate the changes in the context's cultural values, retail market needs, technical demands for manufacturing processes and the sources of power (Worthington & Eley, 1984). The architectural proposal therefore offers a design that allows for the adaptability and variety of the aspects mentioned. This investigation focuses on the leather sector, which forms part of the textile, clothing and footwear sectors. To remain competitive, these sectors need to compete with export markets (Botha, 2014). A way that this challenge can be embraced is with a innovative spatial solution that rethinks the production techniques to offer more opportunities in the form of processes, upskill, employment and tenancy. The adapted factory can then encourage sustainability in the form of resource efficiency, recycling and upcycling of materials. The provision of opportunities of upskill and employment introduce a sense of social sustainability. The survival of industry lies in bridging the gap between the opportunity for change and proposing its reality (Botha, 2014). Industrially and culturally significant innovation suggests a solution to rethink of the typical factory model.

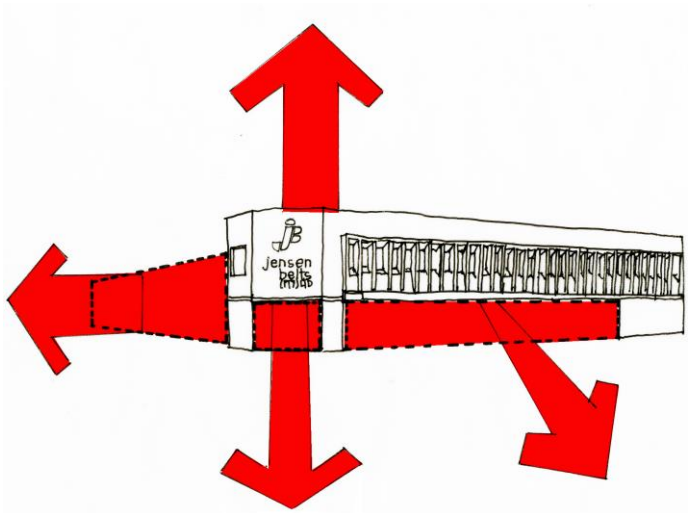
The site presents a series of enclosures, from exact boundaries of enclosed space to projected enclosed readings. The existing site layout presents negative space (Figure 7), which provides the platform for the exploration of transformation. There are three dominant networks: the circulation of goods, the circulation of urban infrastructure, and the circulation of people. The sprawled circulation of goods on the ground floor is enclosed by a masonry wall system, the highway projects the enclosure from end to end to an inactive underpass, and a polluted river presents an enclosure of undesirability. This leaves the circulation of the public with the remaining space – pavements along solid walls that act as envelopes, through inactive spaces, along a polluted river. Addressing the building envelope of the Jensen Belts factory provides the catalyst for industrially significant transformation in the area. Tearing its envelope connects and extends the new program to activate the surrounding negative space.

DEFINING THE ISSUE | PROPOSITION

The tool of Adaptive Re-use is proposed to revitalise the existing conditions of industrial building stock in the Maitland/Salt River area. The brief is concerned with exploring ways that industrial buildings can be adapted from solely housing production and services, to housing a hybrid program serving the comfort and needs of people (Figure 3). The sprawled circulation of goods is sheltered by inadequate space and technology for human comfort. Transforming the space requires the adaptation of the controlled environment which excludes public interaction. Adaptive Re-Use design principles are used to ensure that a hybrid industrial program and permeable envelope (Figure 4) serve as physical and visual connectors to the urban living of the public. The hybrid typology allows for parts of the building program to respond to urban needs, and others to programmatic needs. A permeable envelope therefore feeds the hybrid programming to activate the negative urban space, fostering connections to the urban and public networks.



[3] Floor plan layout variations showing adaptability within a given structured framework.



[4] Diagram representing the building envelope torn in strategic locations to connect to the city.

REPORT STRUCTURE

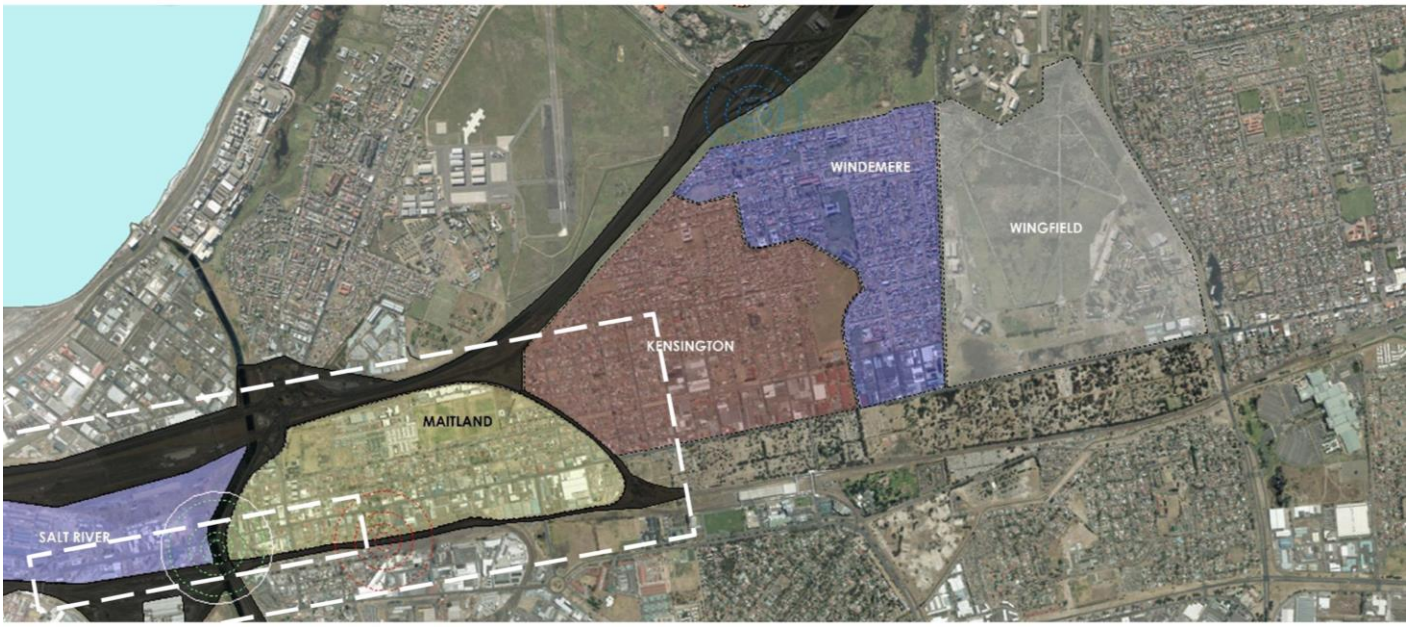
The following Design Dissertation Report is structured in four parts – from the concepts that drive the approach, understanding the existing as a platform to adapt, principles to be understood when adapting in the sector of focus, urban and architectural strategies of implementation, and finally the product designed as a beacon of change.

Section 1 presents the technical and theoretical underpinnings. My site shows examples of architectural and urban elements that do not relate to the surrounding community, creating negative space. This section gives insight into the reason for their placement and insight into strategies to adapt their current state to connect to the urban living of the area in a positive way. Societal, economic, industrial and technological changes are unpredictable, which leads to the need for a space to be adaptable and varied. This section concludes with strategies and technology to achieve this hybrid form of design.

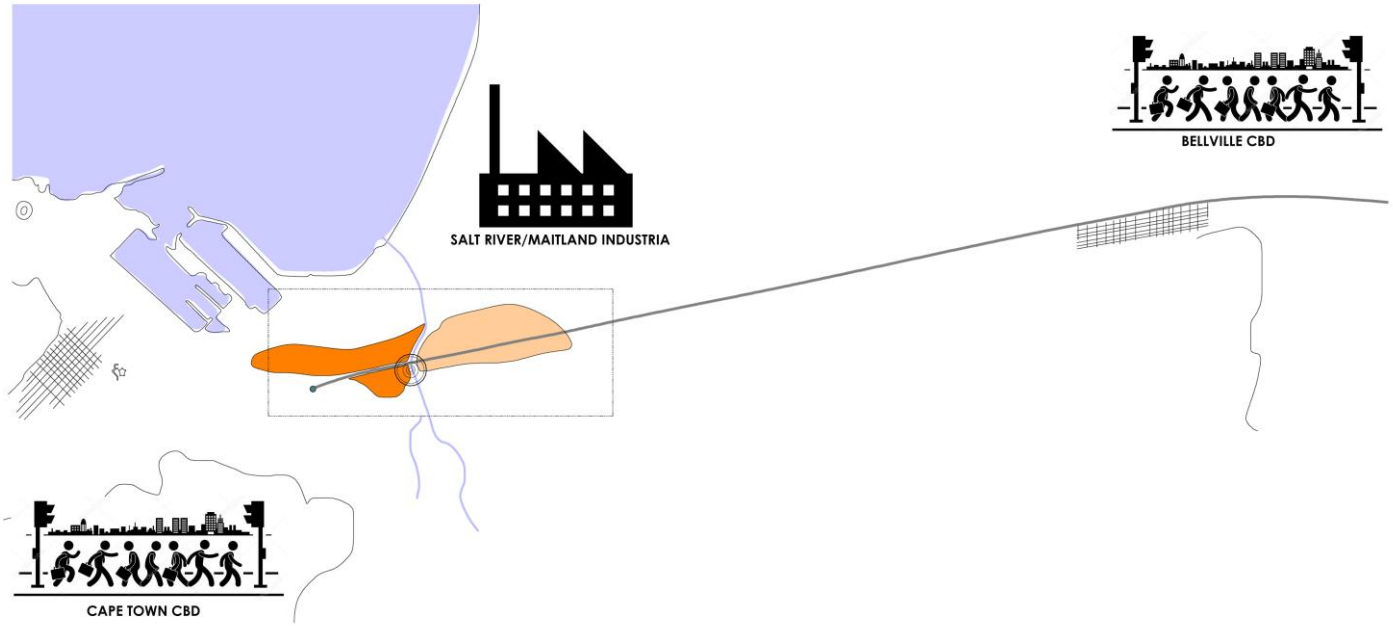
Section 2 explores the phases of transformation that the design offers through its adaptable form. Given that the Jensen Belts factory is operating, three phases of industrial operation are proposed to respond to the possibilities of societal, economic or industrial changes.

Section 3 investigates the architectural and urban elements defined as boundaries in the Maitland/Salt River context and uses the mentioned technical and theoretic underpinnings to inform an attempt to connect the public to the factory building site.

Section 4 reveals the adaptive re-use proposal of the Hybrid Factory, showcasing the implemented strategies that connect the urban living of the public to the industrial program of the building.



[5] Map illustrating the macro-scale disconnection.



[6] Diagram illustrating the intention to develop the Maitland/Salt River area as an Industrial Urban Quarter in relation to Cape Town and Bellville CBDs

[7] Site photos illustrating various tunnels and passages of undesirable space created by progressist design principles of isolation

SECTION 1:

THEORETICAL & TECHNICAL FRAMEWORK

STRONG PROGRESSIST VALUES, WEAK CULTURALIST VALUES

The existing site offers evidence of a dominant progressist model influence, which is an ideal platform for a culturalist reaction – the culturalist model typically responds to the progressist model (Gunay, 1988). The negative space left over from the industrial building design and urban infrastructure is the result of progressist architectural and urban elements designed in isolation with no intention to connect surrounding open spaces (Figure 9 & 10). The infrastructural systems (river, highway, railway, main road) present an innovative opportunity to solve urban connectivity through the different functional zoning separations of the time (Gunay, 1988). The Voortrekker road (main road) offers the opportunity for culturalist intervention, being the network connecting the different functional zones in the area (Figure 8). While industry does not contribute to the street fabric, the commercial areas create the sense of culturalist continuity in their opening up to the street (Dewar & Uytenbogaardt, 1976). Using this functional zone as an influence, the zone of industry needs to adapt to create a continuity of the urbanity experienced.

[8] Functional zoning of the area

[9] Lack of street frontage at the industrial Jensen Belts building

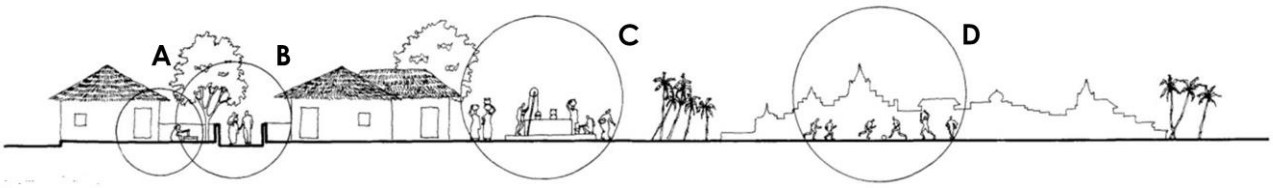
[10] Highway condition of inactive undesirability

[11] Inactive green belt running in-between polluted river and highway

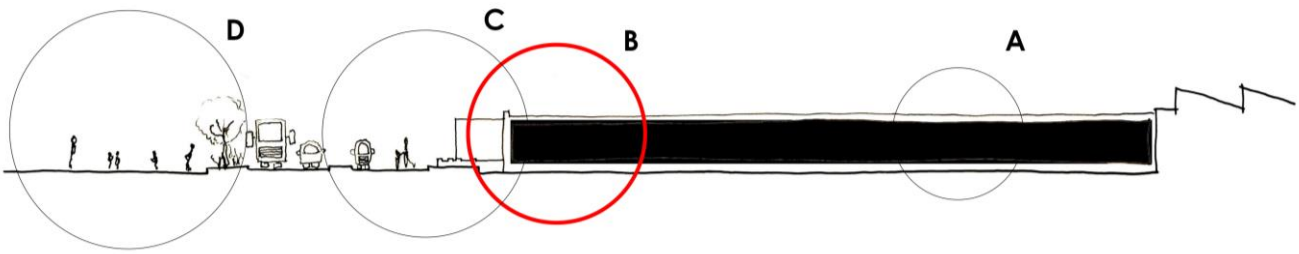
HIERARCHY OF URBAN LIVING

Correa's (1989) idea of the hierarchy of urban living works well with the approach to transformation of my site because it provides a framework of layers to create a more desirable living realm. His framework (Figure 8), based in rural India, contains four major elements, which encourage interaction in their interrelations (Correa, 1989). This layered framework, applied to my site, provides insight to the elements missing – causing the negative, inactive space.

While my site does not provide evidence of the urban poverty Correa (1989) writes about with people 'living and dying on pavements', it does contain negative, unoccupied, undesirable open spaces (Figure 11). Correa (1989) highlights the fact that the urban and architectural spatial arrangements should all prioritise spaces to interact intimately and spaces for large recreational activities. As the existing envelope seals the program of the building from the street and urban realm (Figure 9, 13 & 14), my proposed intervention is to introduce a layered transition of space from the street to the building, through a strategically torn envelope.



[12] Hierarchy of Space in rural India (Correa, 1989, p. 33)



[13] Hierarchy of Space in industrial Maitland

A. Private Use
B. Space of Intimate Contact
C. Neighbourhood space
D. Principle Urban Area

[14] Comparison between the industrial Jensen Belts and the mixed-use building across the road. The Capita Building stands as an industrially significant icon, in its form. Jensen Belts has an opportunity to operate as a building of true industrial significance – hosting adapted industrial processes in a tower that would enhance its iconography, as opposed to the existing model which hides it in a tunnel building form.

CHOICE OF ENCLOSURE FOR SPACE AS A RESOURCE

The resourcefulness of series of spaces in my site's strategic location could not be experienced with the initial rigid existence of the sealed envelope of the black box factory, creating negative space surrounding it (Figure 9 & 10).

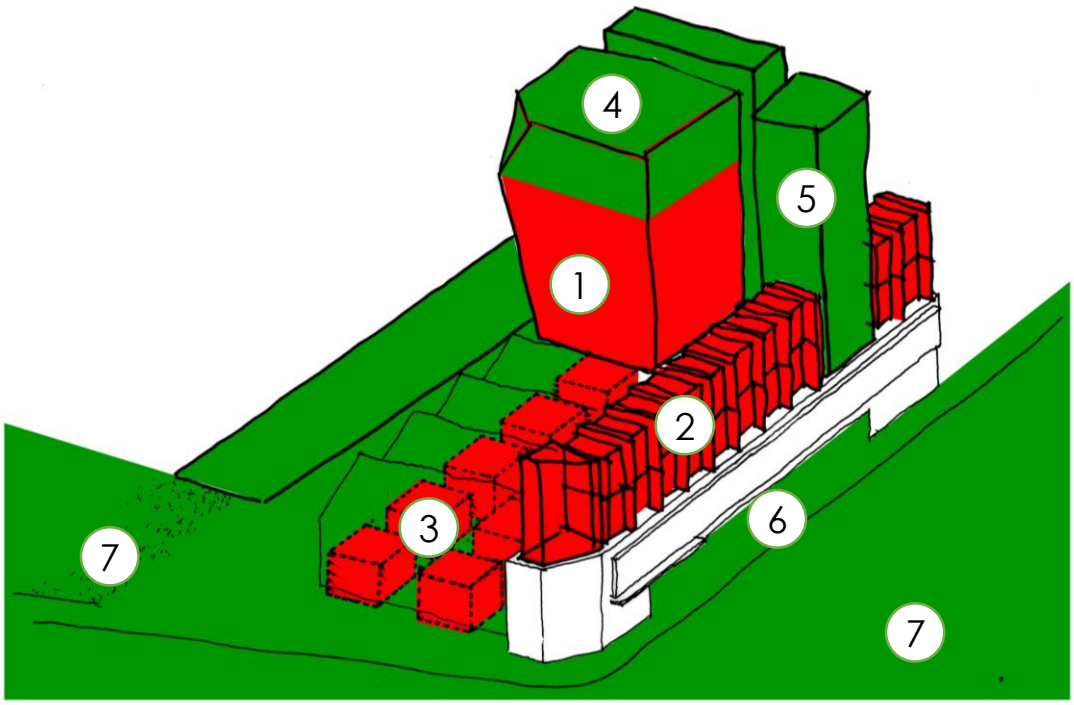
My intervention involves a strategic adaptation of this existing sealed façade, referred to as tearing. This intervention to the façade allows penetration and accessibility to the building main spaces. With the site operating with 100% coverage, different phases of vertical expansion is proposed, with the key move raising the production line from the ground floor. Vertical expansion creates a condition of implied vs physical enclosure to the site. Through the use of prefabricated technologies to frame proposed in an adaptive manner, exists in response to the solidity of the envelope of the building.

The progressist significance of the Maitland/Salt River area offers both implied (inactive highway underpass and polluted river) and literal (building envelope) enclosures. My intervention therefore seeks to use the solid existing walls to frame the space with a literal enclosure, while the proposed steel technologies are used to create combinations of physical and implied enclosures. A combination of these existing physical enclosures, and proposed implied and adaptable literal enclosures offers the opportunity of elemental power in experiencing the resource of spatial relationships (Figure 15). The elemental power of Chinese architecture lies in its strategic range of utilizing both types in a spatial arrangement (Habraken N. J., 1998).

[15] Different proposals of building form in the same position.

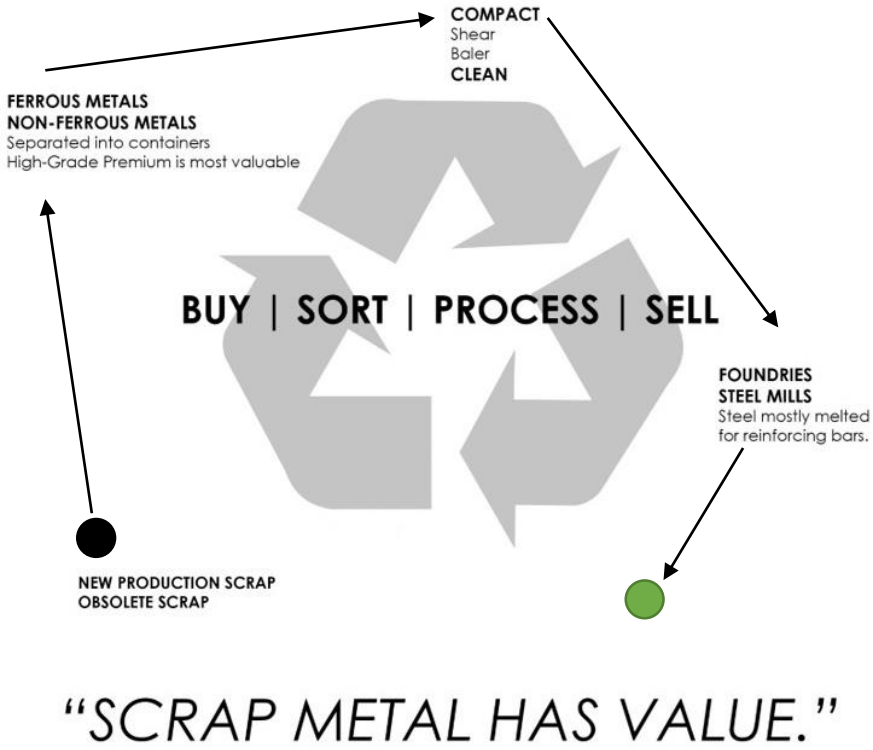
A. Existing building.
B. Elevated rooms above ground plane. 1 level additions to wings.
C. Balconies/circulation overlooking ground plane. 1 level addition to left wing, 2 levels on right wing.
D. Two levels of pods with balcony overlooking ground plane. 2 level addition to left wing, 1 level to right wing.

The M5 highway and the Voortrekker road form two planes of reference that the building needs to respond to, with the highway requiring the visual permeability to connect the passing car. The network of Voortrekker Road requires the physical connection of the circulating pedestrian. The building placed on the urban infrastructural intersection seeks to use the concept of Industrial Urbanism to maximise its location and potential accessibility. Industrial urbanism seeks to encourage mixed-use space for multiple tenancy (Rappaport, 2015). The mixed uses catered for are industrial, educational (workshop and classroom), retail, office, and recreational (Figure 16). The verticality creates the visual presence of an icon that can be experienced from all circulating movement systems. The vacated ground floor creates the programmatic permeability for public access and interaction in a newly established industrial urban quarter.



[16] This diagram illustrates the relationships of vertical industry (1), additional classroom pods (2), adaptable market spaces (3), rooftop restaurant (4), circulation cores (5), workshop spaces (6), and urban surrounds (7). Key to note is the permeability offered through the building with loose program on the ground floor.

The inspiration for the use of steel as the primary structure for the intervention was sparked by the fact that the design project incorporates three stages in the life cycle of steel (Figure 17). I am exercising the recyclability of steel by removing the roof sheeting and trusses, which could be sold to scrap yard two blocks up from the Jensen Belts factory. The scrap yard is able to resell the steel to a foundry for this project to use, after after sorting and processing. The decision to use steel was further enhanced by its attributes of sustainability which suit the requirements of a vertical factory transformation. The usability suits design strategies of flexibility, efficiency and high-rise (Widman, 2005, p. 5).



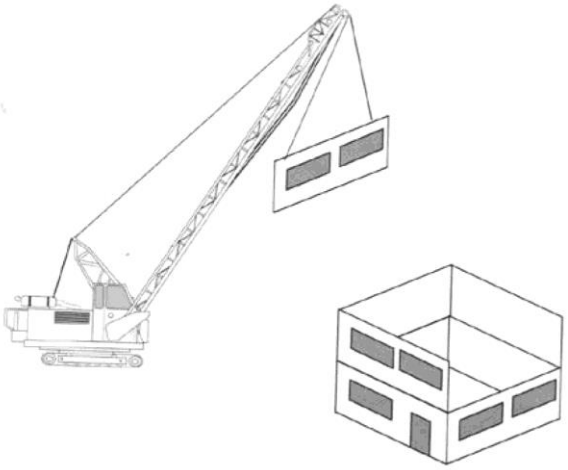
[17] **Environmental information concerning the removal of the existing steel roof and trusses** (Fine, 2017)

- 250 tons are recycled per month to contribute to the environmental footprint.
- Scrap yards supply the foundries to produce new material. Supply and demand is huge.
- ¼ Million people earn money from scrap metal trade in different forms.

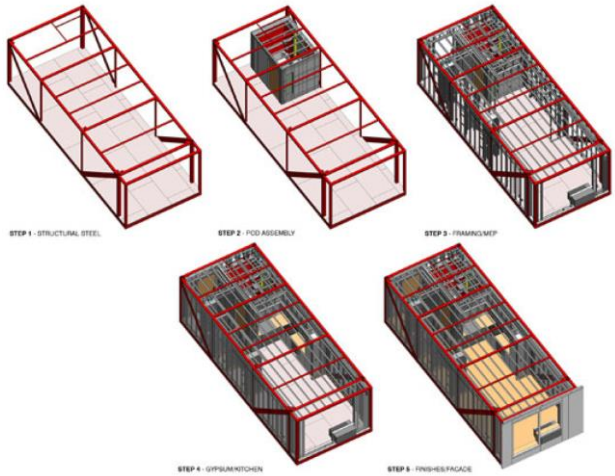
PREFABRICATED PODS AND COMPONENTS

The progressist, innovation in technology is prefabrication construction. Considering the overhaul of technology needed to establish human comfort through strategies of vertical expansion and open space occupation, this technology is used for its speed and efficiency of construction. The first option employed in this design is a pod – a complete off-site construction, assembled and serviced before being delivered to site by crane (Figure 19). The second option employed here is a panel – constructed off-site, and assembled on-site (Figure 18) (Emmitt & Gorse, 2014). These technologies provide the material limit to the building's internal and external enclosure types. The conceptual difference between the two systems is offered through their method of assembly. The complete pod provides the opportunity to design a unit fixed to a certain shape and form to respond to the user's needs (Figure 19). The combination of technologies enhances the experience of technical multiplicity to flourish aesthetically.

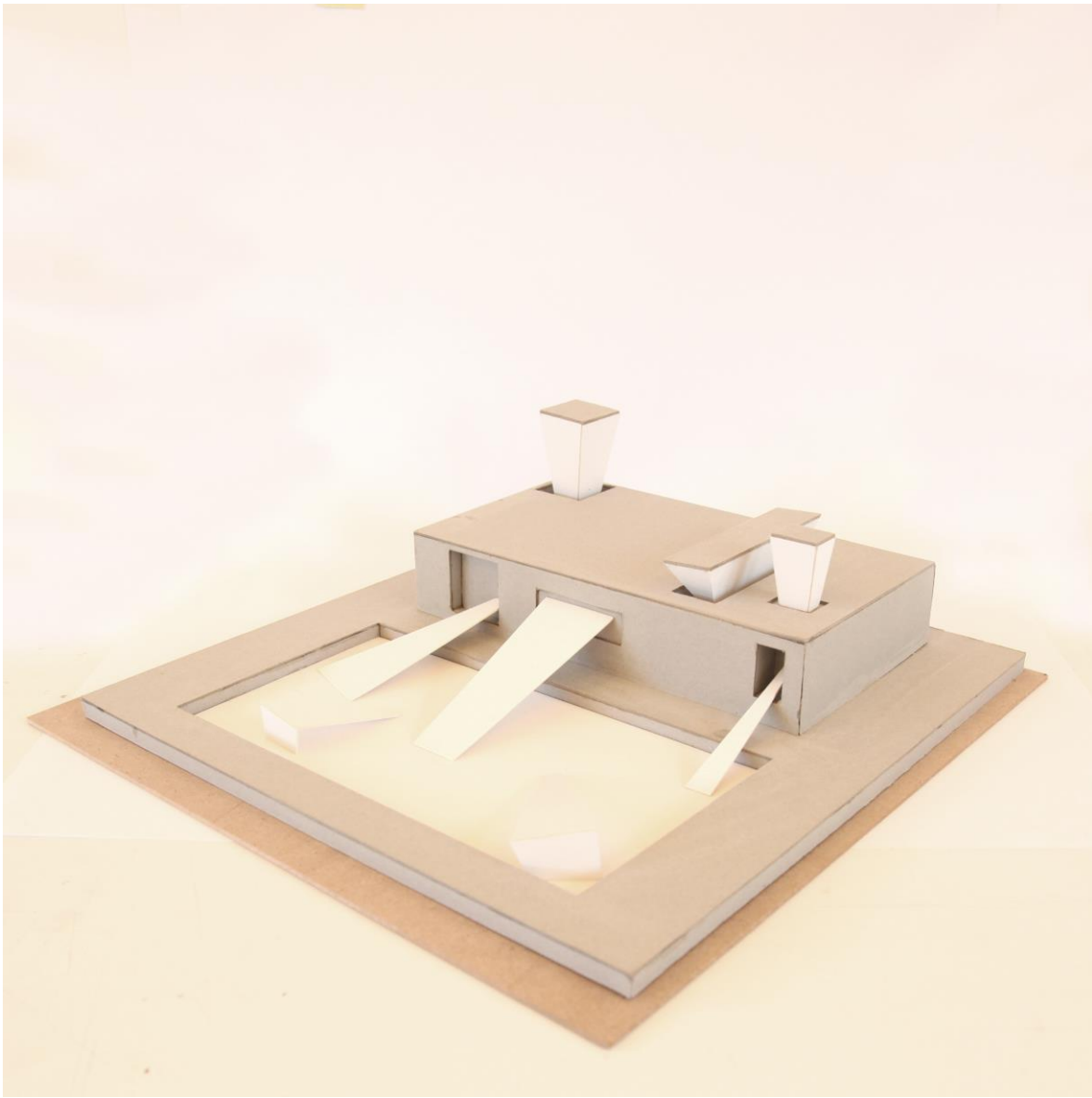
Sixteen pods are proposed in the vertical expansion of the existing admin block for the upper floor classrooms and study areas. These pods are precisely designed and constructed to the ergonomics and anthropometrics of the learning environment. Four kitchenette pods and four toilet pods are constructed service areas of each tower floorplate. The top floor restaurant is serviced by four toilet pods and a large kitchen assembled by a series of components. Prefabricated components and panels are used to arrange loose spaces on the ground floor and the tower floors. These contribute the efficient construction of a technology offering easy transformation of space to respond to the varying requirements through time.



[18] Prefabricated panel delivery and positioning



[19] Process of pod construction



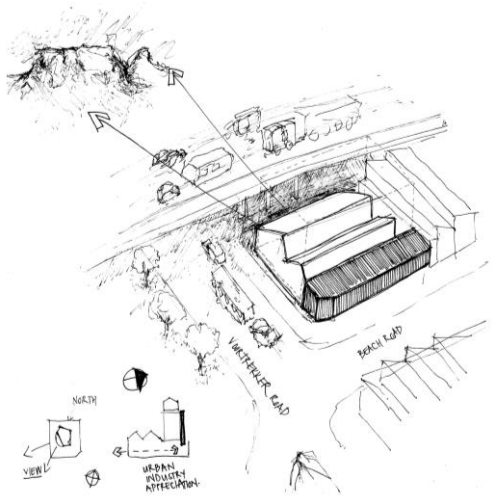
[20] Conceptual model illustrating the enclosure of a form being torn and punctured delicately, influenced by factors surrounding it.

SECTION 2:
TOWARDS A NEW INDUSTRIAL TYPOLOGY IN THE CITY
Definition of the programme / accommodation
and technical requirements

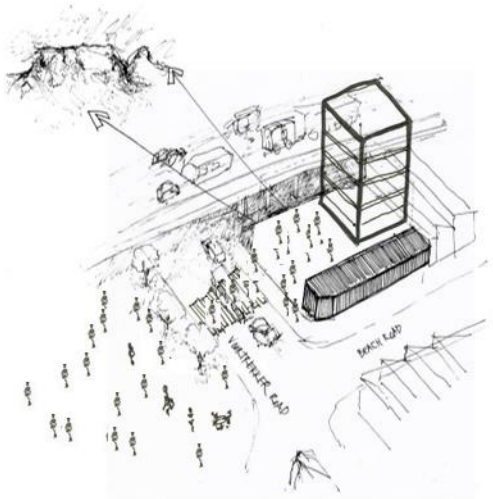
This section seeks to explore the key design strategy of vertical expansion – lifting the horizontal production line from the ground floor into a vertically programmed tower, and projecting the possibilities of the factory development in the event of sectoral challenges having an effect on tenancy.

Despite numerous attempts to visit the Jensen Belts building, I was not granted access. I developed an understanding of the process of leather manufacture through case study visits to Wolff and Maiden, Woodheads, and Rarity handbags – these visits aimed to get a general understanding of the production of leather to be applied to the Jensen Belts building.

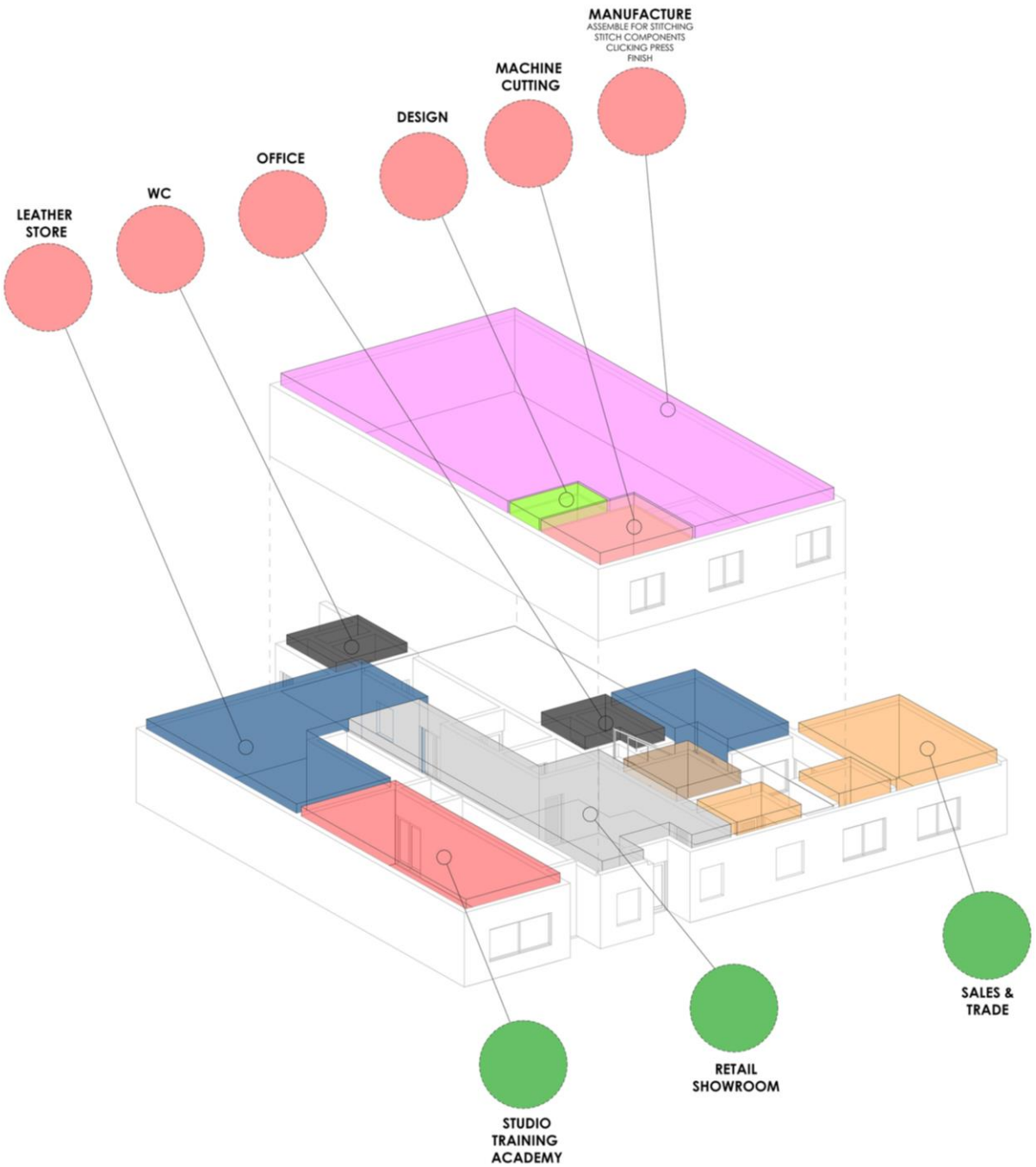
This design explores four phases of programmatic transformation to discover the potential of the future leather factory. The transition seeks to capture scales of production, exploring the spatial implications of horizontal and vertical long-run production, short-run production, and the future exploration of the usability of the space provided. The phases ultimately have two urban responses. The first phase acknowledges the production line on the ground floor (Figure 21), while the following three phases provide transitional program in a raised tower that allows the ground floor to act as a public interface (Figure 22).



[21] Sketch illustration of the negative public space resulting from the production line sprawled on the ground floor



[22] Sketch illustration of the positive public space encouraged from the production line raised from the ground floor.



(23) Model of Woodheads *leather merchants* production model. This model shows the example of Phase 2 of my four phases of transformation. The elevated production process frees the ground floor interactive mixed uses of retail and upskilling.

1. WORK INSTRUCTION -PLACEMENT OF ORDERS

2. GOODS RECEIVING

3. SORTING FOR PERCENTAGE LAYOUT

3. CUTTING & CLICKING

4. PRODUCTION SKIVING.

5. PRODUCTION - EDGE PAINTING

6. HANDBAG MAKING - COMPONENTS

7. SAMPLING

8. WORK INSTRUCTION -STITCHING

9. WORK INSTRUCTION -CLEANING

10. WORK INSTRUCTION -QUALITY CONTROL

11. WORK INSTRUCTION -DISPATCH

(24) Long-Run Production model provided by Jaqueline Burge (Rarity Handbags). #3 was added by Wade Skinner (Wolff and Maiden)

1. WORK INSTRUCTION -PLACEMENT OF ORDERS

2. GOODS RECEIVING

3. SORTING FOR PERCENTAGE LAYOUT

3. CUTTING & CLICKING (BY HAND)

4. PRODUCTION SKIVING.

5. PRODUCTION - EDGE PAINTING

6. HANDBAG MAKING - COMPONENTS

7. SAMPLING

8. WORK INSTRUCTION -STITCHING

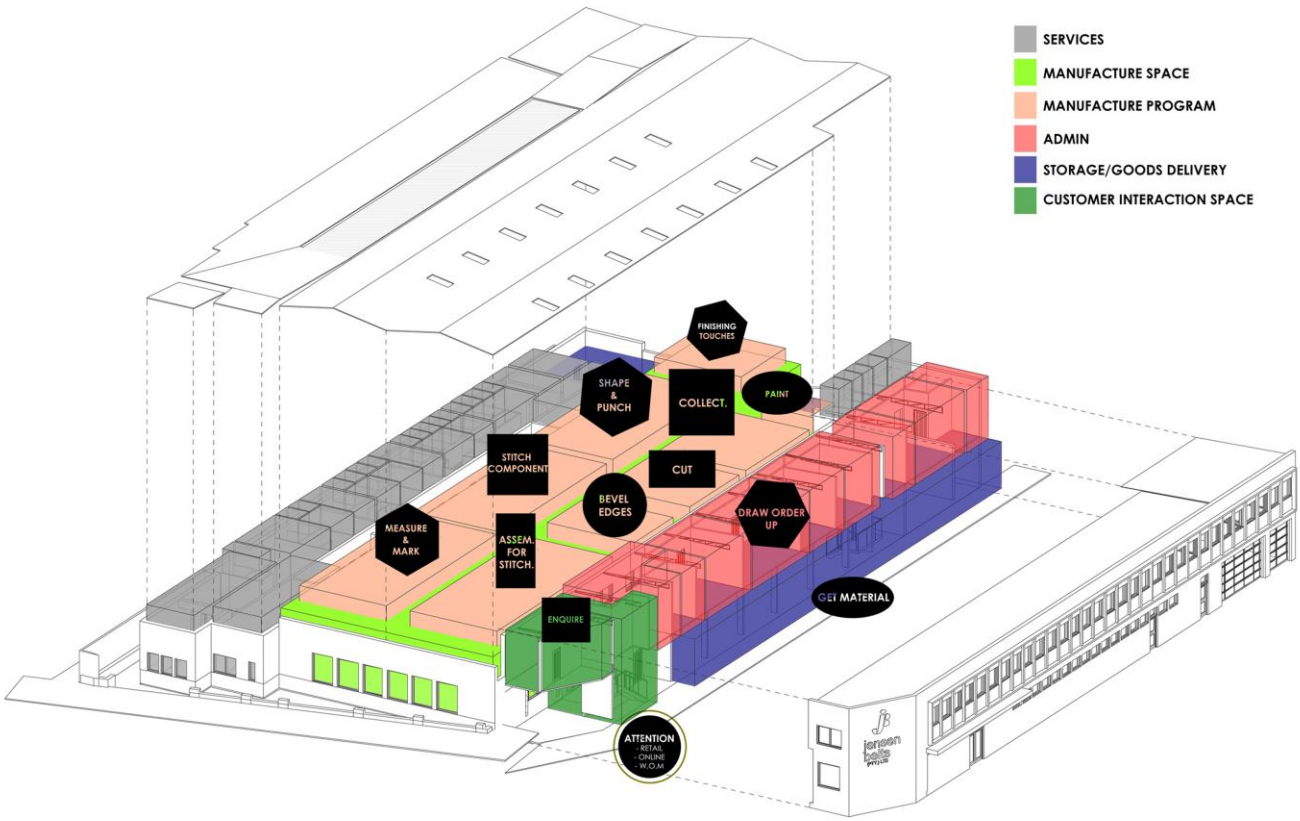
9. WORK INSTRUCTION -CLEANING

10. WORK INSTRUCTION -QUALITY CONTROL

11. WORK INSTRUCTION -DISPATCH

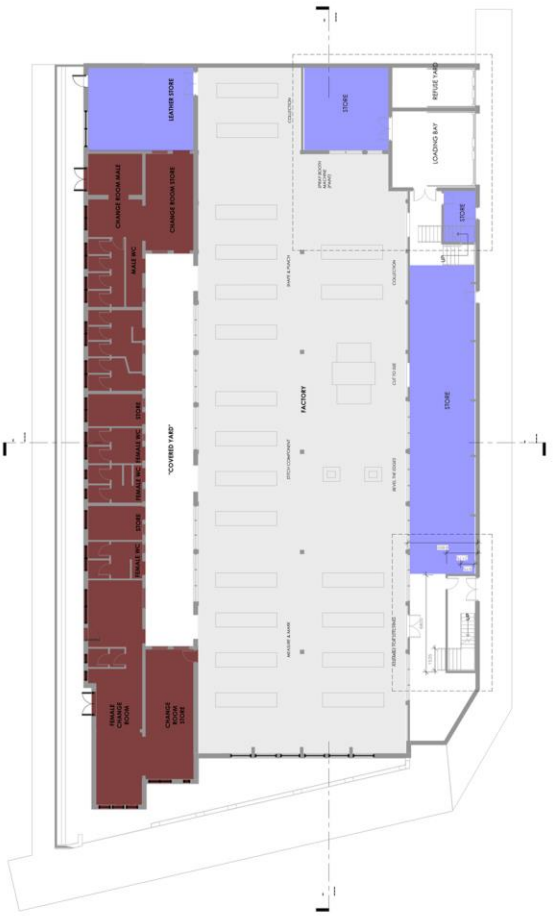
(25) Short-Run Production model provided by Jaqueline Burge (Rarity Handbags). #3 was added by Wade Skinner (Wolff and Maiden)

Jensen Belts operating as a single-tenancy factory serves as the found Phase 1 (Figure 26). The deep, shallow space, resembling a tunnel, is characteristic of an equipment/storage/open space ratio of a space not dependent on natural light (Worthington & Eley, 1984).

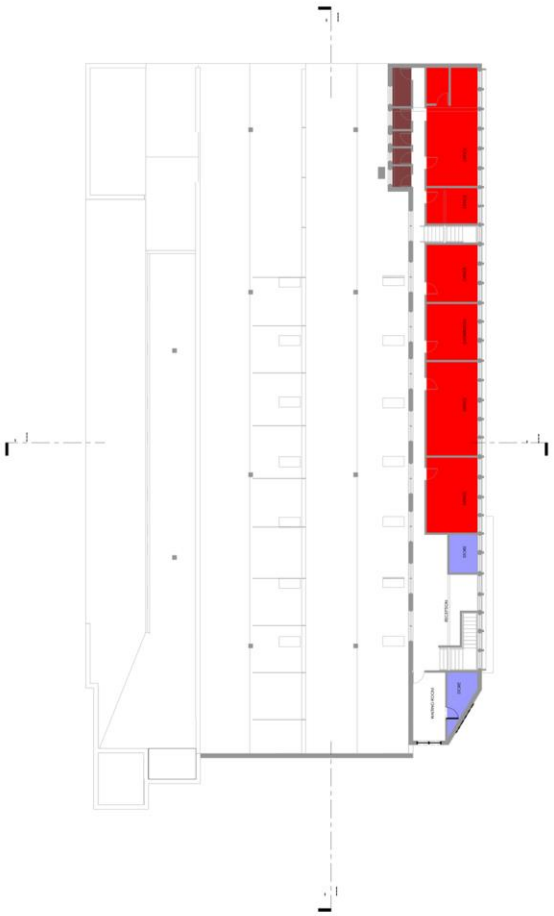


[26] Phase 1: Jensen Belts operating as a single-tenancy factory

This solidity of wall and roof enclosure indicates that the primary usability of the ground floor is an exclusively indoor activity. With the site operating at 100% coverage, it leaves the worker with the recreational spaces of an outside alley in between the highway and the building, and an internal covered courtyard in between the changing room wing and space of manufacture.



[27] Ground Floor Plan



[28] First Floor Plan

Admin (112m²)

Staff Change rooms & WC (112m²) | Admin (12m²)

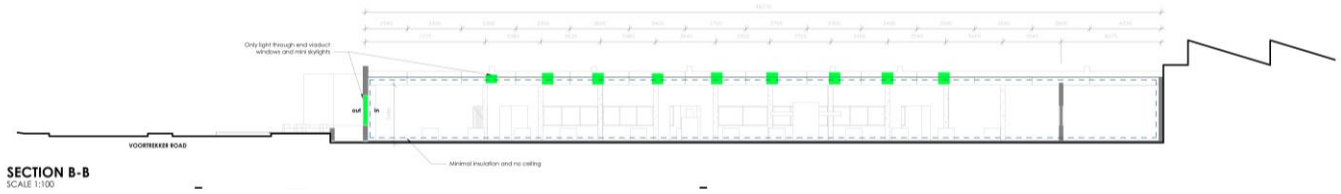
Storage (200m²)

Storage (652m²)

1000 2000 5000

Programmatic Area Coding

[29] Ground Floor Plan



[30] Ground Floor Plan

In this sense, a hierarchy of control is created (Habraken N. J., 1987), where the sealed enclosure of the 100% site coverage is dependent on the manufacture program filling the floor to capacity. This tunnelled space of manufacture does not utilize the potential of accessibility and connectivity due to the program dominating the floor.

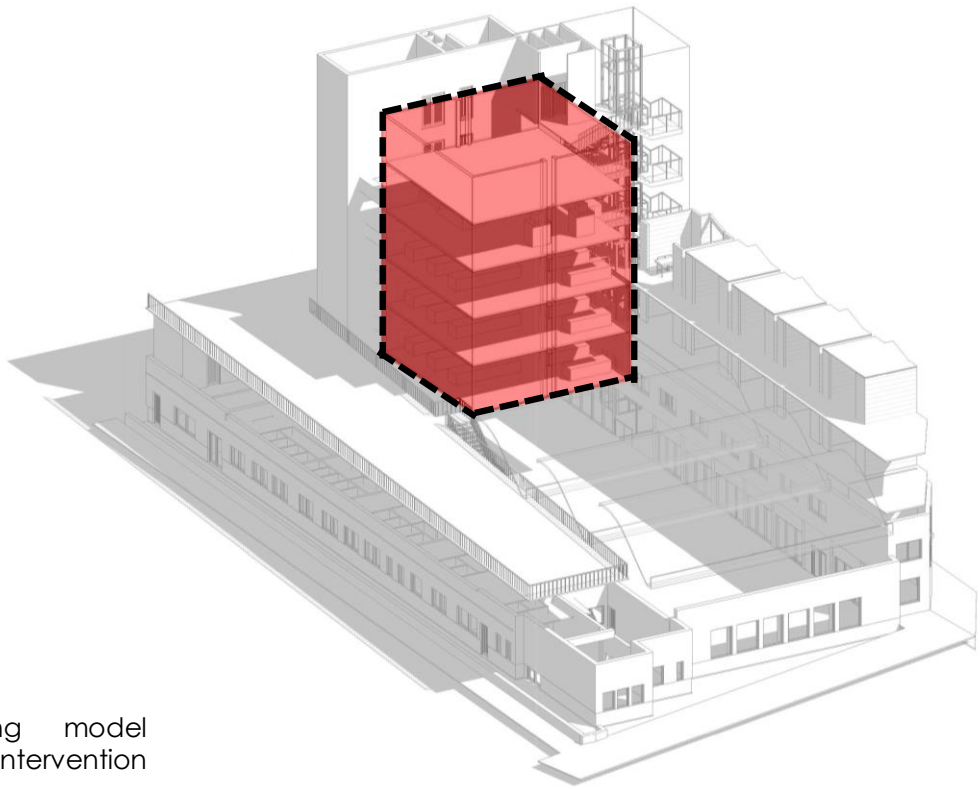
Introducing the tower to host the anchor program releases strain of containing this dominating program.

[31] Internal perspective view of horizontal long-run production showing the idea of the industrial tunnel.

The following two phases introduce the concept of the Working Community Workshop, which focuses on a hybrid model inspired by the employment, upskilling, and recreation of the community. The intention is to provide a series of parts to form the multiple-tenancy programmatic intention of the building. This model is explained completely in Section 3.

This section focuses on the primary move to design a tower which shifts program from the ground floor, removing the dependency of the program to operate within a sealed envelope, into an adaptable tower. The proposed tower is built with adaptable prefabricated enclosures to allow the form to enclose a variety of operations.

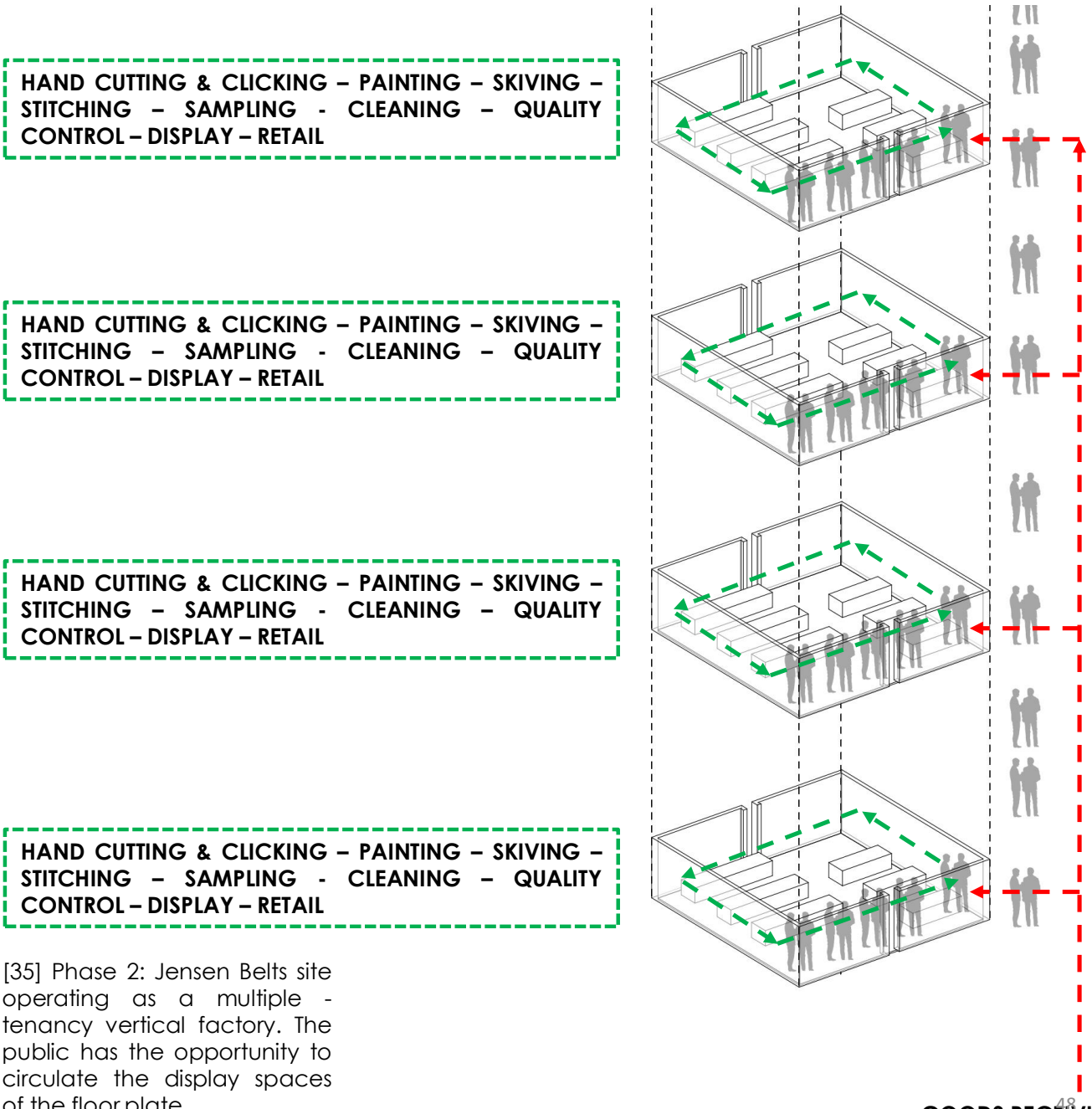
The focus of the tower seeks to invest in the adaptability required of the industrial building avoiding ruin. The tower anchoring program, frees space to cater for community needs within a progressist industrial building. This elevated shift creates the culturalist condition of connectivity between the building and urban living.



[32] Building model highlighting intervention in the tower

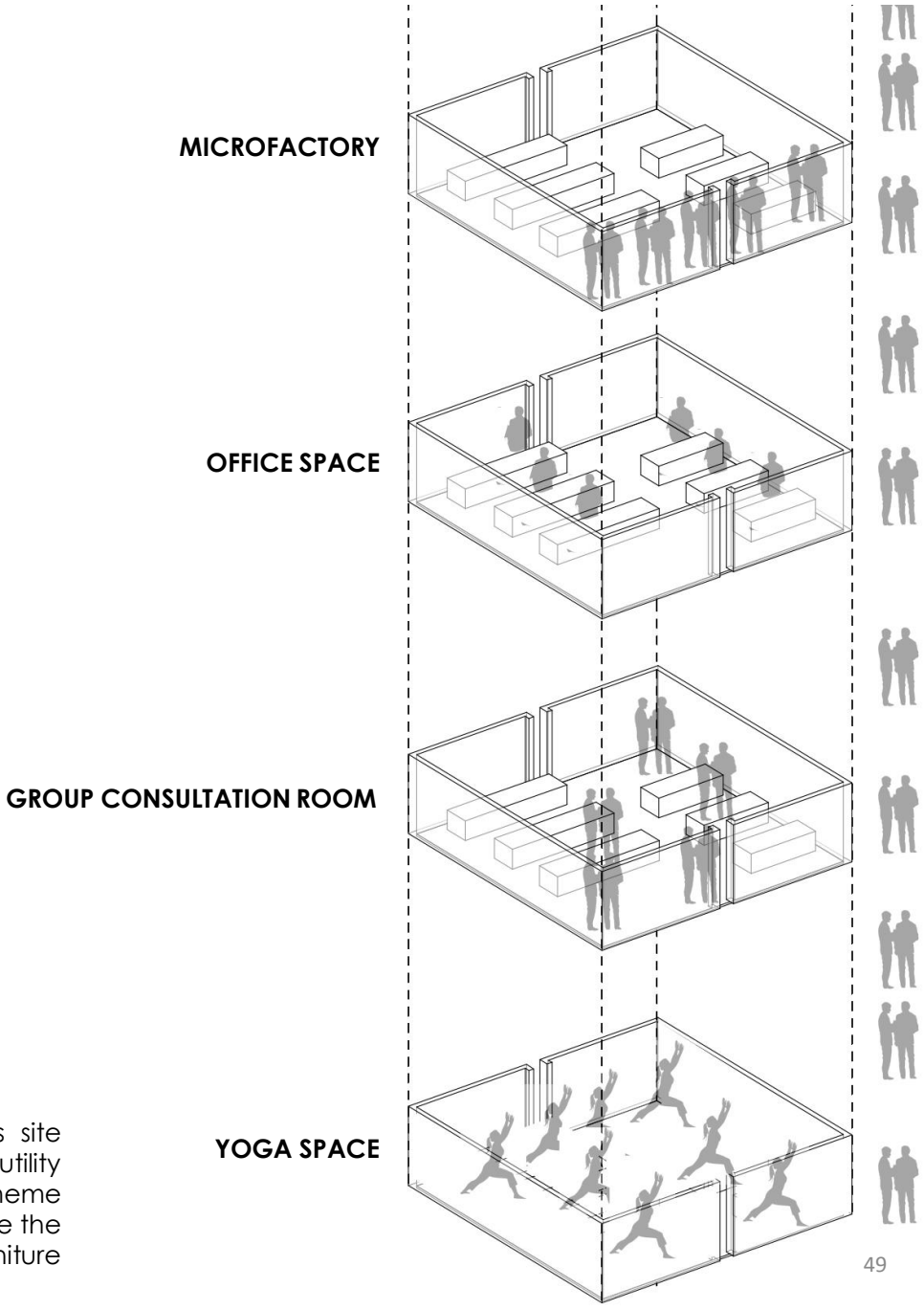
A 10x10m floor plate is proposed for the tower, which is adequate for the operation of long- (control hierarchy) and short-run (part-whole hierarchy) leather manufacturing (Skinner, 2017). The increase in height by the proposed five floors introduces the requirement of goods and passenger lifts (Worthington & Eley, 1984). For efficiency of operation, each floor is serviced by its own toilet and kitchenette (Figure 35). The floor plates are serviced adequately for the shift between dependence of one production line, and the independence to operate separately. The following sections highlight the adaptability of the formations.

The idea of the multiple tenancy with micro-factories introduces the part-whole hierarchy with Phase 3. This phase shows the ability of the 10x10m floor plate to host a short-run production process which excludes the heavy machinery of long-run production. Including retail/display into capacity provided by the floor plate, encourages the territory to be shared by circulating public (Habraken N. J., 1998) (Figure 37). This completely interactive nature of manufacture and retail introduces the distinction of the community workshop factory, from the long run production line factory.



[35] Phase 2: Jensen Belts site operating as a multiple - tenancy vertical factory. The public has the opportunity to circulate the display spaces of the floor plate

Phase 3 concludes the intervention phasing with acknowledging a future of possibility of industrial redundancy. The ability for the floor plate and services to accommodate a loose programmatic fit or multiple functions prevents the building from becoming abandoned or a ruin in the area (Figure 38). This phase shows the transformation ability of the floor plate and technology. The theme of prefabricated envelope is tested with different furniture arrangements as sub-themes (Habraken N. J., 1987). The envelope seen as connecting dividers in this phase allows the space to become resourceful in various interpretations.

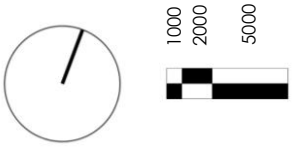


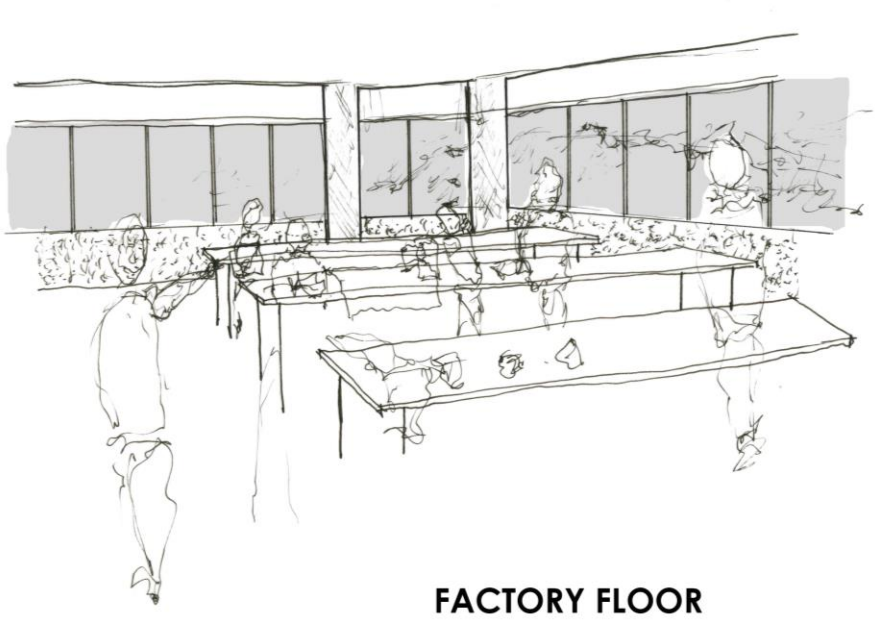
[36] Phase 4: Jensen Belts site operating as a building of utility for a variety of functions. Theme of prefabricated walls frame the subtheme of various furniture arrangements.

These phases seek to continue the progression of the factory model. The first step is to move to a vertical order provides the opportunity to free the ground plane for an urban interface. The tower, seeks to provide the opportunity for single and multiple tenancy production, and a future of loose program (Figure 39 & 40). The idea of the tower therefore seeks to provide a generic floor plate which offers the building to shift between control and part-whole hierarchies of opportunity for different functions. It is important that this factory adaptation provides the ability to provides the spatial opportunity for the forward-thinking embracing of these sectoral challenges.

Phase 2 is the focal phase for this investigation. The Leather Industry is still in motion, although the scale of manufacture needs to decrease in size to respond to the efficiency required.

The intervention at the intersection of these networks seeks to create an atmosphere of mobility. The quality of the space is framed by the program of production at different, changing scales. The character of the space resembles an industrial quality of fabricated componentry. The building is the catalyst to the theatre of production intended to represent an industrial significant experience. It facilitates the making of things, and a street interface separate, where the making of things can be observed.





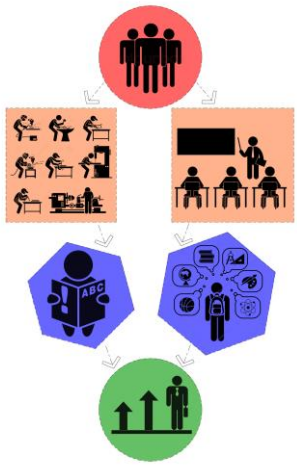
(39) Experience from the factory floor, with quality views to the mountain and daylighting

The analysis of the existing problematized against the new uses Phase 3 as the core proposal reflecting the Community Workshop Model.

This adaptation is pitched at a time where the leather industry is in need of adaptation (Botha, 2014). The design therefore seeks to acknowledge the existence of production, although shifting the production from long- to short processes.

This anchor tower of short-line production is supported by workshop spaces, classrooms, retail spaces, and a café/restaurant.

The intention of this model is to provide a variety of opportunity for the community to be skilled for employment (Figure 40). The multiple-tenancy is supported by a workshop model that shares services, and management that aids their development as businesses (Figure 41).



[40] Community Model

[41] Workshop Model

The response to the rigidity experienced in the urban realm will be analysed through the lens of Correa's (1989) Hierarchy of Space, for the purpose of fostering connectivity for the multiple-tenancy site. The layers of the hierarchy foster interaction between people, and are derived from an understanding of community interrelations in rural India (Correa, 1989, p. 33). The layers concerning rural India are as follows:

A. Private/Primary Use (cooking, sleeping and storage)
B. B. Areas of intimate contact (such as the doorstep)
C. Neighbourhood meeting areas (such as the village well)
D. Principal urban area (gathering areas for the larger city

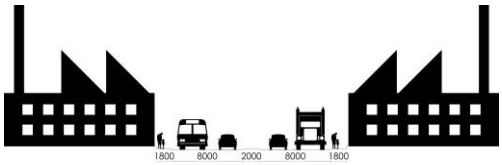
These layers provide a lens to apply to the understanding of architectural and urban connections and accessibility on the site.
My site shows an urban living hierarchy for infrastructure of 2 layers: A. Private/Primary Use, and D. Principle Urban Area. The urban living hierarchical system generally consists of a various number of systems ranging from private to public use (Correa, 1989, p. 33). The layers of rural India indicate that the introduction of layers B and C could foster interaction on the site. In analysing private use as primary use in the site analysis, the factors concerned, as mentioned, are the Black river which creates a physical boundary due to its pollution, the M5 highway which projects an enclosure over inactive space, the Voortrekker Road which is a network through different functional zoning and street interfaces, and the undesirable route from the railway to places of work. My analysis supports the intervention of adding layers 2 and 3, tearing these enclosures, introducing positive spaces through mixed-use programs. Layers 2 and 3 represent the culturalist connections between these progressist urban infrastructural networks, feeding off the anchor hybrid program of the proposed factory.

(42) Street view of Jensen Belt's bold industrial modernist presence on the urban intersection on Voortrekker Road.

(43) Site Plan indicating views, proximity and movement nodes.

VOORTREKKER ROAD

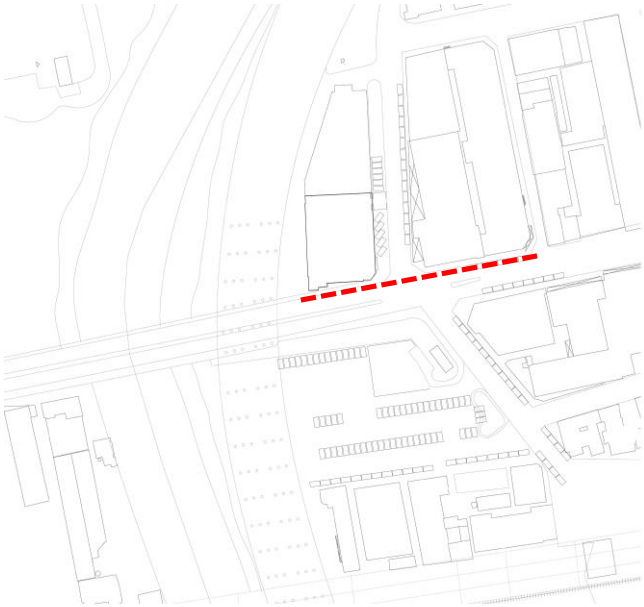
Voortrekker Road is the ground plane network used for its connectivity between different progressist industrial zones and urban infrastructure. The industrial street frontages that have created negative urban spaces initially have been torn strategically to foster programmatic connections, influenced by the street frontages enhancing the road in the commercial zoning areas (Figure 44). The urbanity is enhanced through this intervention of different zonal influences of street frontage.



Industrial Zoning

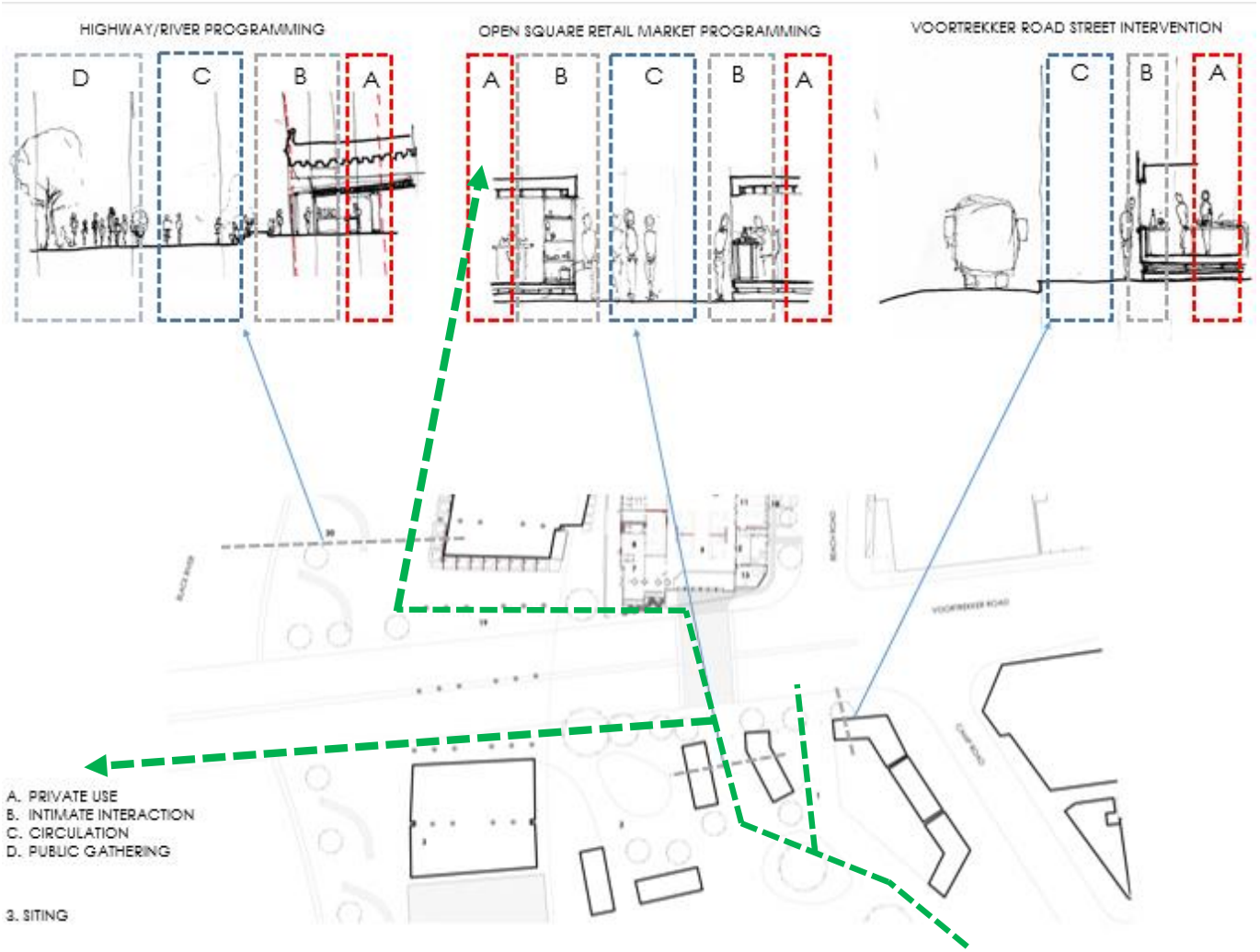
Commercial Zoning

(44) Street view indicating the commercial influence on the industrial street frontage

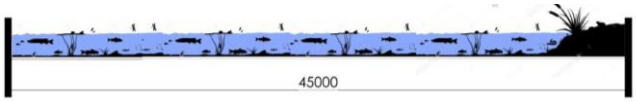


RAILWAY

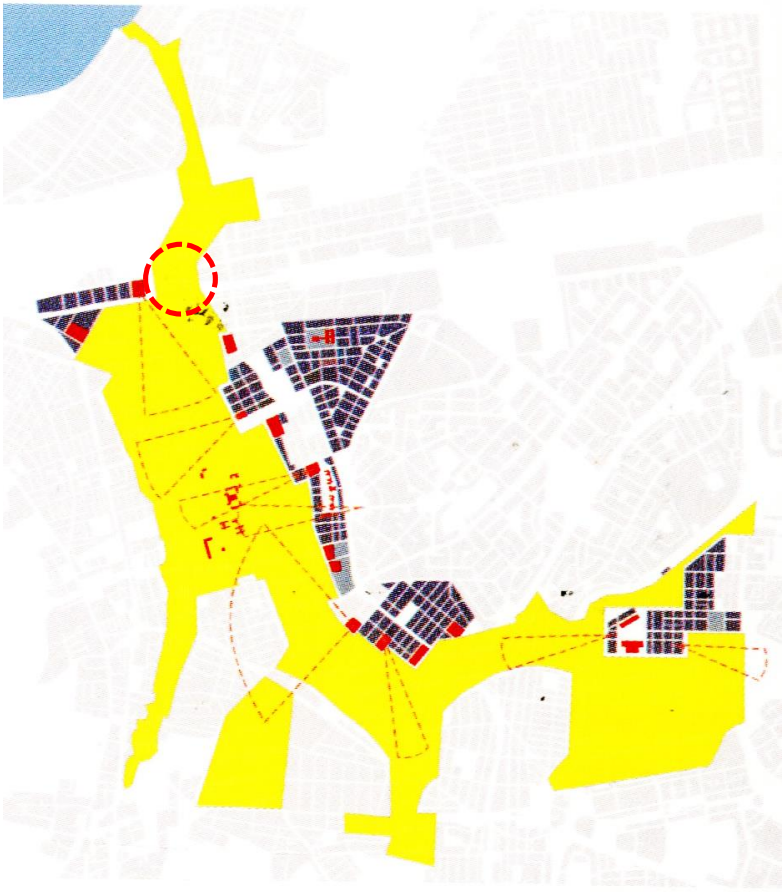
The Koeberg station feeds a pedestrian desire line which crosses the open area across my site (Figure 45), to places of work. This route is used as a guide for a market area which is framed around the desire line.



(45) Site plan showing desire lines and routes to be lined by markets.



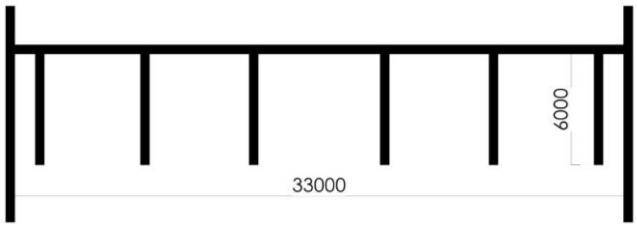
TRUP (Two Rivers Urban Park) is an initiative that has developed a proposal that engages the Black River's water treatment (Syndicate, 2014). The design uses the landscape band running between the progressist highway and the river from the proposed Urban Park to foster a relationship between citizen, environment, culture and history (Gunay, 1988). The subtheme of a network of components serving as furniture provide the tools for the area to serve as capacity for urban living.

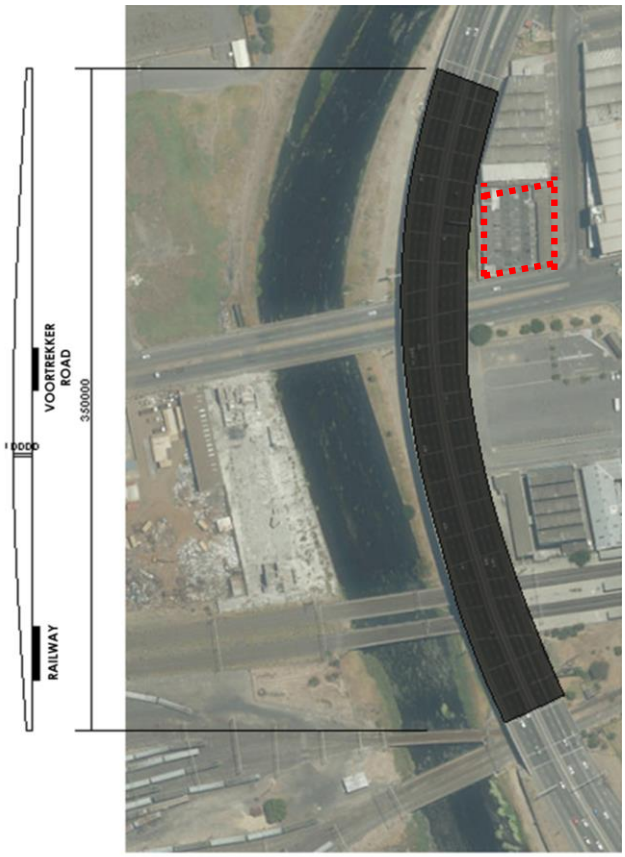


(46) Proposal by TRUP to create a green belt supported by mixed-use program, connecting to the ocean. My site is situated at an intersection where their proposal for development stops. The Jensen Belts factory proposal could serve as the catalyst for continuing their goal for densifying around ecological connectivity.

M5 HIGHWAY UNDERPASS

A flexible market space, and temporary pop-up space are the mixed-use functions chosen to activate the underpass (Figure 48). These temporary activities seek to establish an essence of place through spaces of congregation, mobility and engagement (Venturi, 1977). This program of living suggests a strategy to address needs of employment and safe spaces of recreation. As a tool of mobility, the highway presents an urban condition for the tower to respond to. This response can be seen in Section 3.





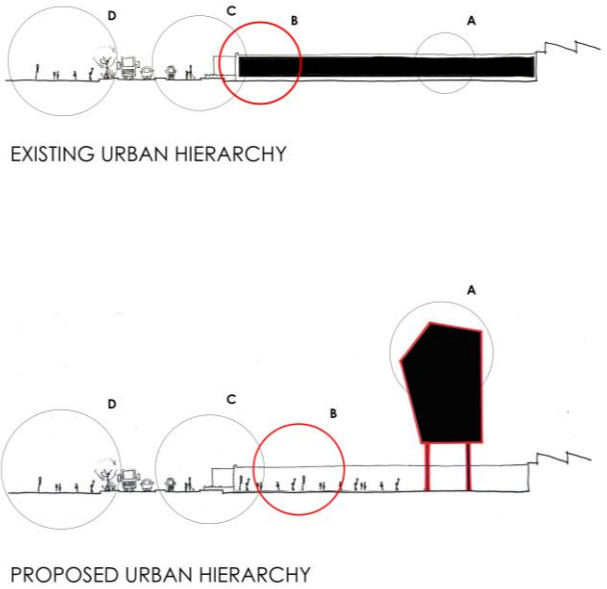
[47] Analytical diagram highlighting the available space underneath the highway.

[48] Folly for a Flyover is a precedent for temporary occupation of the highway underpass

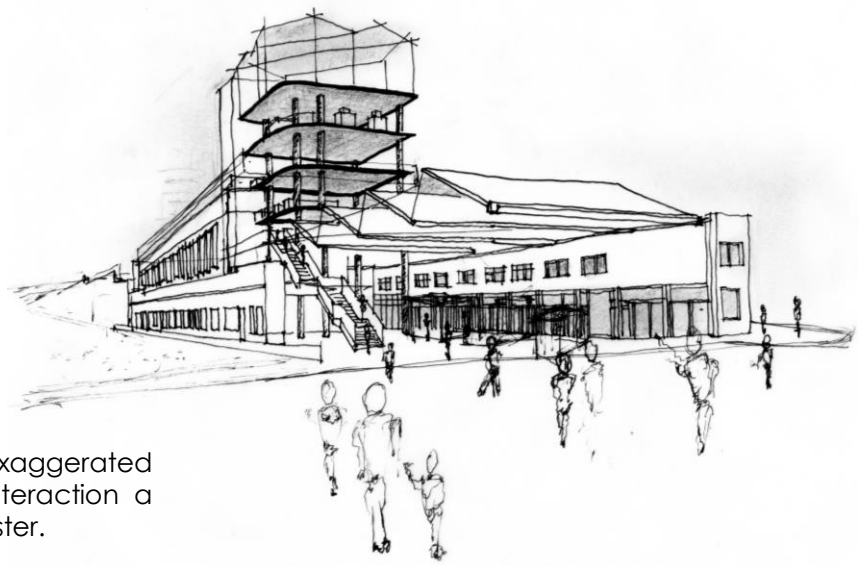
The architectural layer introduced in this urban analysis is the site parameter analysis of the rigid Jensen Belts factory design (Phase 1). The urban living hierarchy suggested that all layers A, B, C and D were present, but through interrelations that are not conducive to feeding positive urban living.

The building (Layer A) related to the Principle Urban Area (Layer D) via a door opening up to pavement parking. This skipped two elements in urban living hierarchy, with the Neighbourhood circulation space on the pavement along the physical enclosure of the front wall. The Private Use of the building, being the singular production line sprawling across the ground floor, housed an environment that is controlled. This means that in this layout, the walls had to remain sealed from the public. The rigidity of this and other industrial buildings affected accessibility and circulation in the area. The spaces surrounding the factories were dominated by vehicular activity during operating hours, and inactivity and a lack of safety after hours. This analysis suggests the recipe for the negative urban atmosphere.

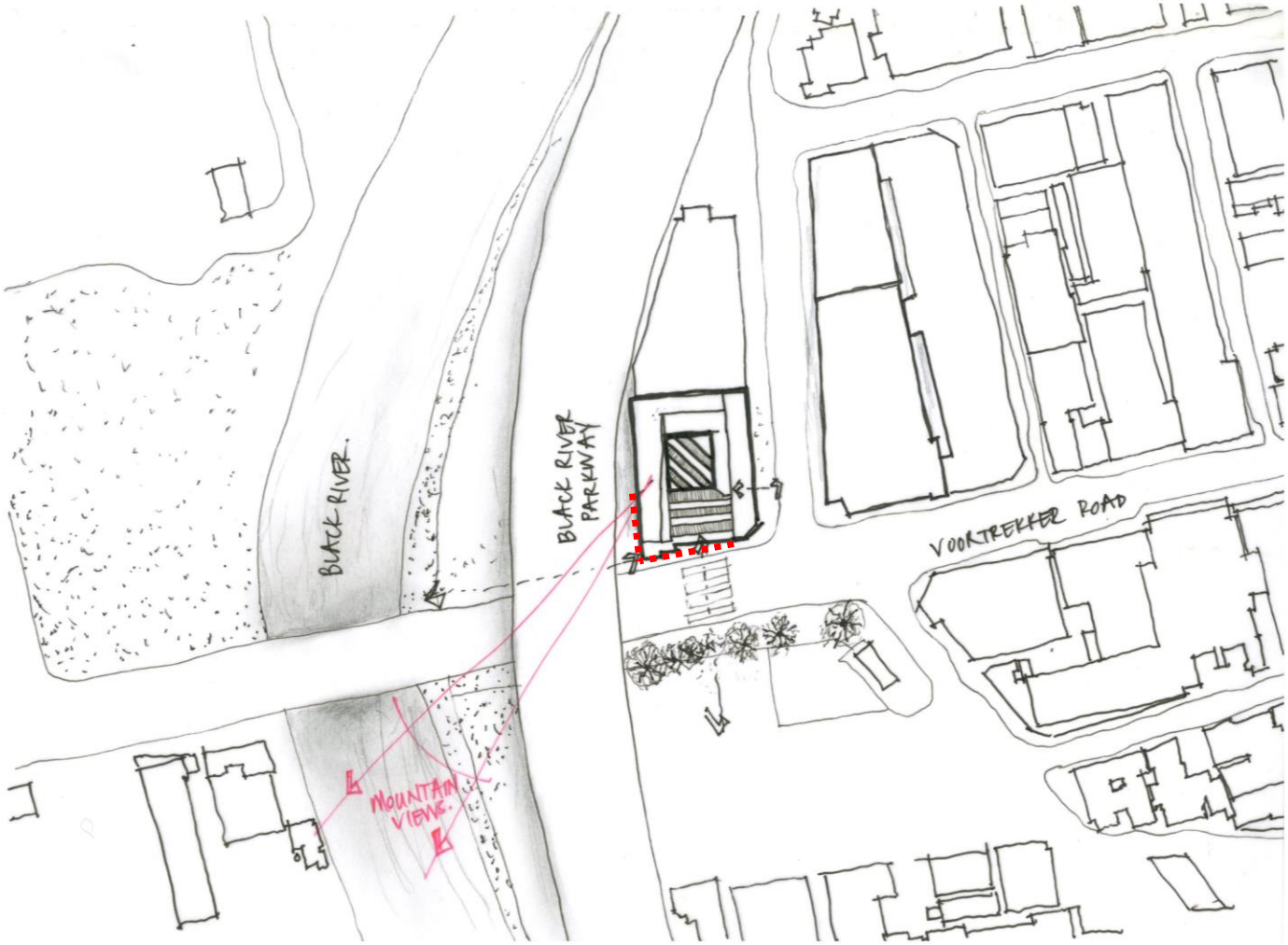
The proposed architectural hierarchical system for the new industrial urban quarter holds four layers: A. Primary Production Process, *B. Interactive Adaptable Ground Floor, C.. Pavement Neighbourhood Plane,* D. Principle Urban Area elevated from the ground floor. The urban hierarchical system holds three layers: A. Urban Infrastructure, B. *Interactive Programmatic Connector, C*. Principle Urban Area. The proposed urban living hierarchy encourages public interaction and positive urban spaces through interventions in tearing through the projected and physical enclosures.



[49] Sectional diagram showing the transformation of the building's relationship to the urban living of the area.



[50] Sketch of an exaggerated expression of the interaction a torn envelope will foster.



[51] Site Plan Sketch indicating a proposed angled shift to the tower, responding to the views and North.

REVEALING THE POTENTIAL IN TEARING THE ENVELOPE

This section is introduced with the study of an existing industrial ruin to understand the typical lifecycle of a building, in order to project a prevention strategy of Jensen Belts becoming a ruin (Figure 52). Research, and the study of this ruin, showed that our physical environment (buildings and urban factors) are built to exist and operate. The problem arises in the changing nature of society and businesses, which highlights rigidity of purpose served in a building as a flaw (Worthington & Eley, 1984). With changing businesses and societies, spatial, servicing and structural demands of buildings need to be adaptable.

The building ruin study is the Allied Concrete factory, supported by a typical lifecycle building framework (Worthington & Eley, 1984) (Figure 53 & 54). This study highlights that intervention to avoid it becoming a ruin was required at a point in-between stages 3 and 4. A building adaption at these stages would have offered the factory shared occupation with multiple tenancy initially, before the factory vacated the site. This would have allowed ownership and maintenance to change, as opposed to being abandoned.

The layered investigation into Allied Concrete's form transformation through time indicated the complication behind a sprawling expansion, which made the central program less accessible (Figure 55). This exploration suggests that the highest accessibility into the industrial site is gained through vertical expansion and densification of program.

[52] Site plan indicating the reality of ruin in the Allied concrete factory, that faces the operational Jensen Belts factory.

Table I Typical life cycle of building

	Stage	Process	Results
1	Birth	New activity or new process is housed by building shell Degree of flexibility provided in design of building may vary	building user is accommodated
2	Expansion	Uses expand to meet new requirements New services introduced; Interior layout adapted	strain placed on fabric possible extensions adaptation
3	Maturity	Uses continue to fit building Or current needs exceed capacity	periodic maintenance and minor adjustments new space taken elsewhere or more extensions and re-planning
4	Redundancy	Change in: sources of power societies' cultural values market needs technology catchment areas	no maintenance; building in limbo application for permission to redevelop attempt at letting vandalism; fire o: other damage decision to demolish

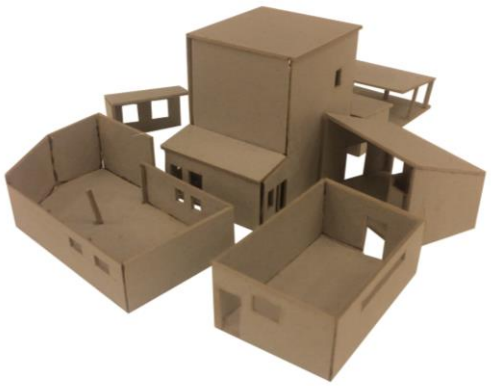
[53] Typical life cycling of an industrial building descriptions

In the uncertainty of business and society, the adaptation of the Jensen Belts factory is proposed in the current leather and textile crisis in South Africa (Botha, 2014, p. 1). Speculating that this exists in between stages 3 and 4 of the industrial life cycle (Figure 53), companies are generally downsizing, closing or retrenching as a result of rising labour and energy costs, and water and resource scarcity (Botha, 2014, p. 1). A future building type that offers alternative occupation opportunities, will have an impact on different sources of income and occupation to the site. The intention is to avoid the building reaching a point of redundancy.

[54] Speculative industrial lifecycle of the Allied concrete factory, informed by historical aerial photographs and maps.

ALLIED CONCRETE FACTORY, SALT RIVER
SPECULATIVE LIFE CYCLE STUDY

1945



1951

1966

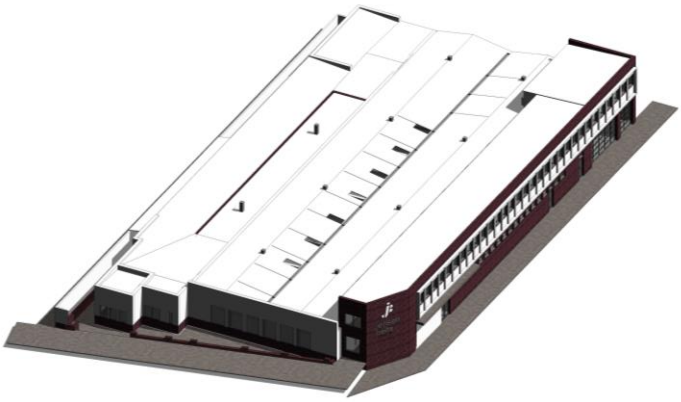
1996

[55] Model exploration of the growth of the factory through time, informed by historical drawings from the South African archives.

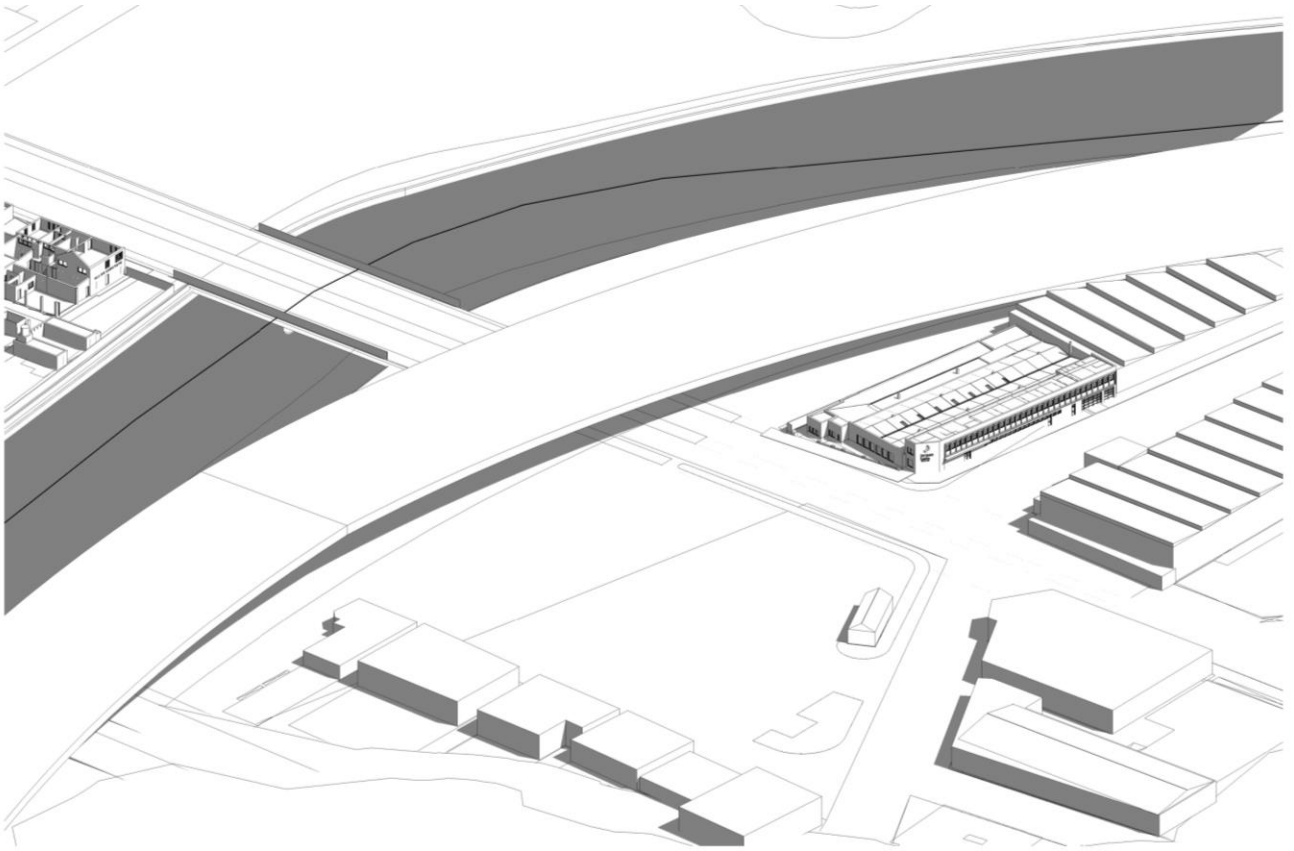
INVESTIGATING THE ENVELOPE FOR ACCESSIBILITY AND CONNECTIVITY

I had to reconcile with industrial spatial type investigations to provide a technical and programmatic understanding of the building. Council drawings provided an understanding of construction techniques, while an analysis through similar type provided an understanding of possible fabric conditions.

Provided that Phase 1 represents the found building (Figure 56), Phase 2, 3 and 4 propose the crux of the intervention. For the intervention analysis, Phase 1 will be problematised as the building facilitating production, against the intervening moves of the three phases proposing an adaptation to serve people.



[56] Existing Jensen Belts model of Phase 1

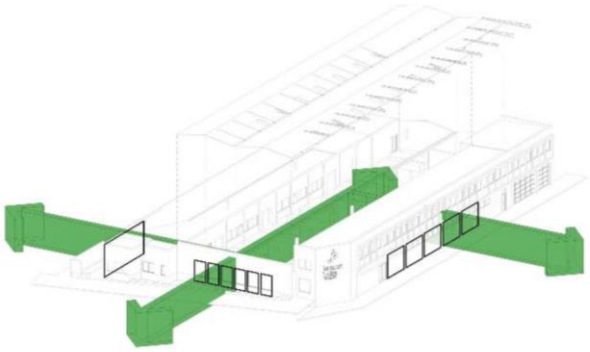


SITE 3D

[57] Existing site model

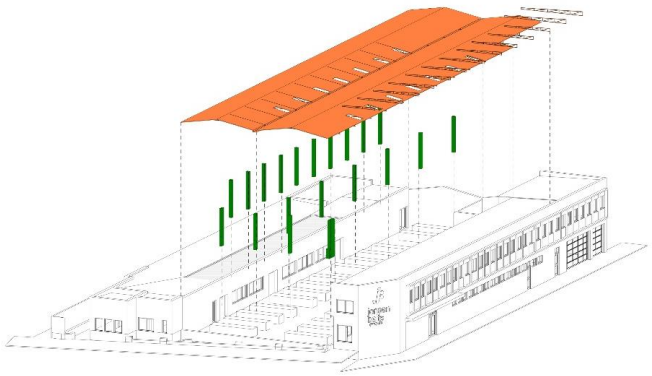
The ground floor wings of Phase 1 are banks of servant spaces in storage and toilet uses. This provides a barrier of possible connectivity to Beach Road (storage wing) and the river (toilet wing). The territorial shift of placing workshop spaces in the Beach Road (storage) wing dictates the strategic envelope manipulation (Figure 61). The capacity of the space is shared with a requirement for circulation, workspace, storage and display. The serviced wing vacated by the toilet uses the strategic location of servicing points to add the capacities of café and restaurant space to facilitate the interface the circulating public has with the program, market, and river (Figure 60). This programmatic shift creates a 3-way aspect for the ground plane, granting aspect, natural light and ventilation to the space (Worthington & Eley, 1984) (Figure 58).

The depth – height ratio of Phase 1, housing storage and equipment programming, now changes with the space allocated to the public interface. The Private Use main space of the factory houses the circulation of people, leading to the removal of the double pitch roof (Figure 59). The proposed double-volume sawtooth roof increases the open-to-sky coverage, which is a direct response to the quality of natural light and ventilation required in the space.

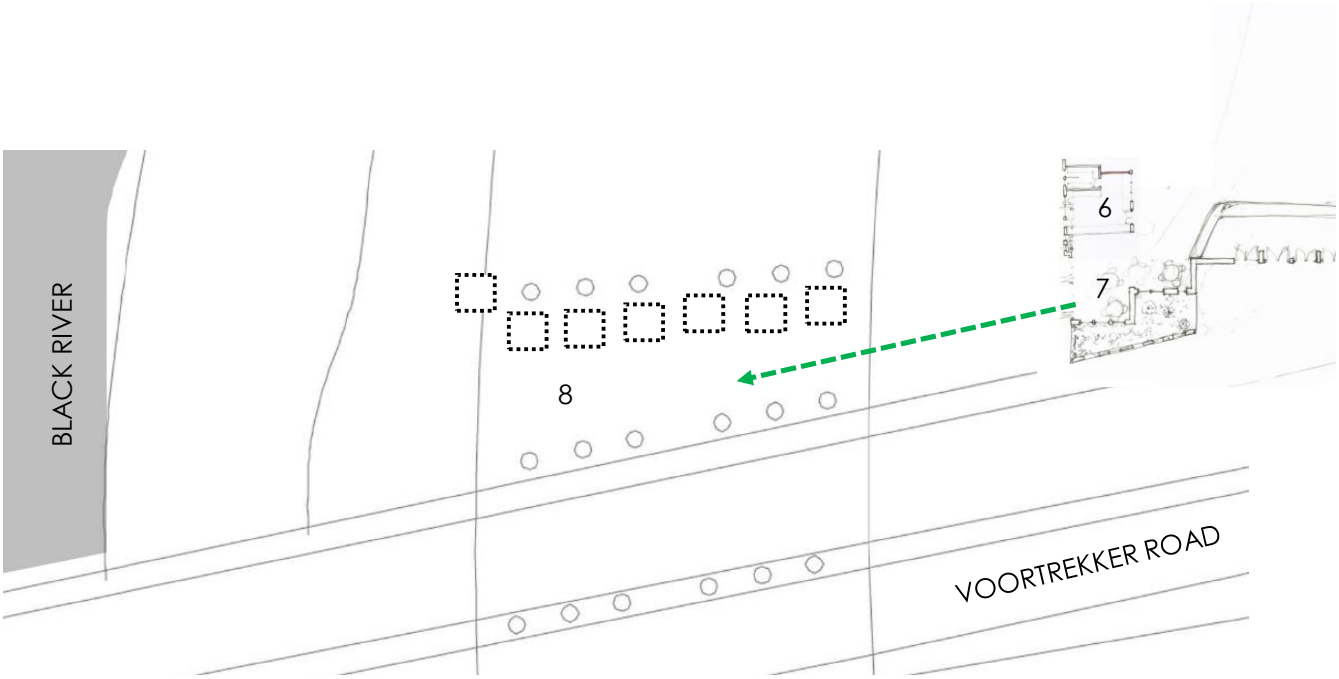


BUILDING PERMEABILITY MOVEMENT INTENTION

[58] Diagram indicating direction of permeability, and placement of the strategic envelope tears.

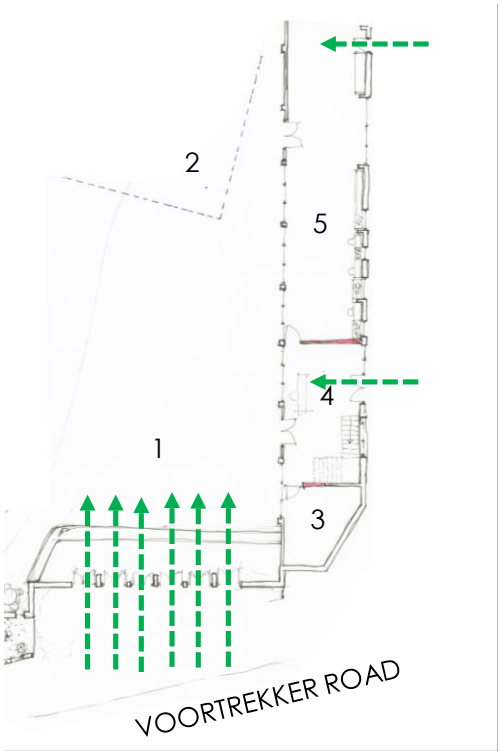


[59] The metal roof sheeting and steel trusses are to be sold to the Fine Trading scrap yard to re-enter the life-cycle of steel sustainability. The concrete and brick demolition will be recycled for a replacement for aggregate



[60] Proposed floor plan of the adapted services block, introducing a café/restaurant

1. Main Open Space
2. Prefabricated Tower Above
3. Front Manager's Office
4. Reception
5. Workshop
6. Kitchen
7. Café
8. Temporary Market/Pop-Up Area

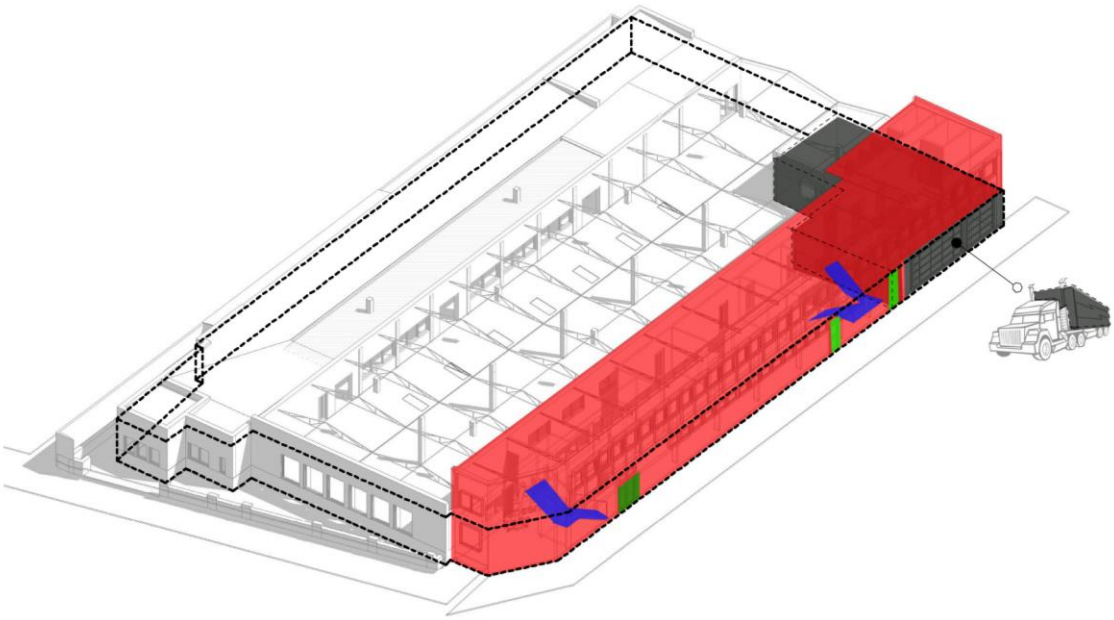


[61] Proposed floor plan of the adapted storage wing, for workshop spaces

LAYERING THE PROGRAM

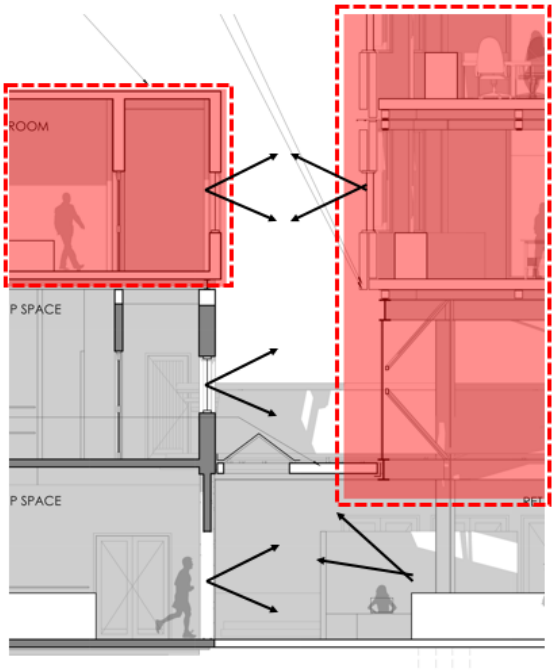
The layers of program transitioning through the envelopes responds to the problem of Phase 1 (Existing) banking the wings with solid programming which creates a sealed envelope. The proposal of layers therefore seeks to continue the hierarchy of urban living from D and C, to a transitional experience of B, to A (Correa, 1989). The administrative wing holds a commanding industrial presence in its bold aesthetic. In Phase 1 it facilitated important programmatic functions of main entry, goods delivery, a bank of storage and a bold window motif highlighting the position of administration (Figure 62). The bold wing is valued for its interface of effective communication through site. Altered for new uses, the wing facilitates the interface of workshop and classroom spaces and circulation to administrative spaces and the core tower (Figure 63). The addition of classroom pods constructed as a vertical extension provides the additional bank of educational programming, providing vertical interaction between new and old.

[62] Beach Road wing serving as interface for circulation of goods and people

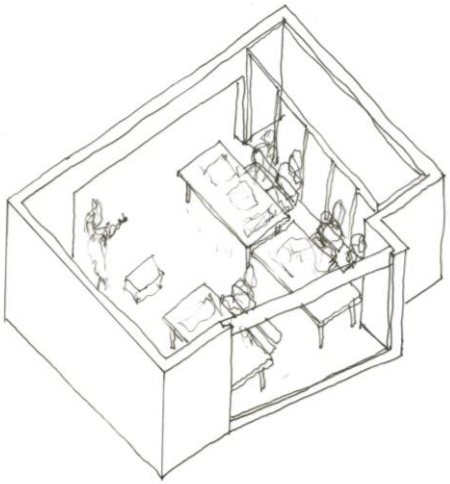


The layering of this wing's effective communication through the building is maintained through the phases. Phase 1 shows the windows on the first level of the administration block, overlooking the manufacture space and views. As an overlooking factor of communication between the wing block and the main space, the intervention is designed around keeping it. At 5,5m high, the new roof allows for this opening to overlook the main space layering the interaction.

The prefabricated classrooms placed as a vertical extension of this block replicate the domestic scale boldness with an industrial fabric. Here, the value of this bold existing block is reinterpreted in modular construction above, to show that the same occupation is possible with the industrial aesthetic.



[63] Adapted Beach Road wing facilitating the vertical communication of the new and old of the site.



[64] Volumetric Design of Classroom Pod

In housing people, now, the initial production space is double volume to allow for the penetration of ventilation and light. The industrial fabric continues with the choice of saw-tooth roof performing the climatic function of relating to the elements and the visual function of connecting to the tower.

[65] The spatial experience of the building main space now enclose by the saw-tooth roof.

RELATIONSHIP OF EXISTING AND PROPOSED STRUCTURE AND FABRIC

To note, the structure of the building is responsible for load-bearing and stability, while the fabric consists of the structural covering and other surfaces (Worthington & Eley, 1984, p. 105).

The contradiction between the industrial and domestic fabric is replicated in relationship of existing and proposed (Figure 63). These characteristics are of the building's enclosure, which needs to serve the purpose of culturalist connectivity in the shift from progressist dominant program (Gunay, 1988). The domestic scale, and finishes in administration spaces suit the inhabitation of potential students in workshop spaces learning crafts. The state of enclosure is addressed for this industrial building to fulfil a modernist concern of resurrecting a social program, as well as a service of production (Low, 2002). The introduction of prefabrication is seen to provide a new industrial fabric to the experience of the spaces.

[66] Collage model representation exploring aesthetic relationship of prefabricated fabric with existing fabric.

SECTION 4:

DESIGN DEVELOPMENT

STRUCTURING THE NEW INDUSTRIAL TYPOLOGY

This section seeks to provide insight into the further exploration into the final four weeks of the year.

The exercising of three modes of steel construction is used for different methods aiming for vertical expansion applicable for multiple tenancy.

The use of volumetric pod construction suits the fixed classroom arrangement on the Beach Road wing, chosen for the ease of crane accessibility to position, and the minimal requirement for adaptability (Emmitt & Gorse, 2014). Prefabricated panels are chosen for the tower construction for the possibility of adaptability of enclosure through the different phases. Lightweight steel framing is chosen for the main production space that allows for adaptability of an area limited to two floors.

The three methods of steel construction allows development to occur quickly or in increments. Constructed off-site in a controlled environment allows quick, efficient construction of material with ergonomic quality.

STEEL FRAMED PUBLIC SPACE

The intention for this space is to be adaptable to a variety of public uses, serving a purpose through time, avoiding redundancy.

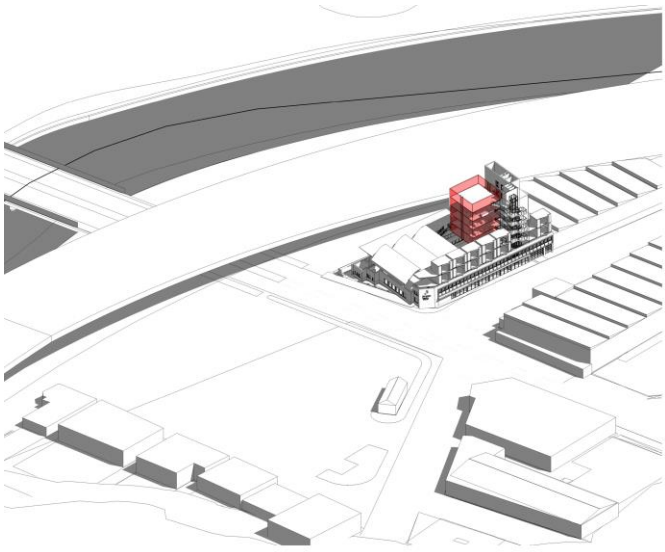
The new possible uses in this form are offices, light industrial/craft and retail units, and large public spaces. The 6m high sawtooth roof sheltering the space increases the natural light and ventilation experienced in the building, catering for the option of the variety of uses.

VOLUMETRIC CLASSROOM PODS

Sixteen pods are proposed as a vertical extension on the admin wing, which still allow for flexibility, although limited to a domestic nature, due to the positioning on the Beach Road.

PREFABRICATED TOWER

A prefabricated 10x10m tower is proposed to house the different phases of occupation. The tower can be assembled efficiently, minimising the impact construction could have on business and industrial operations. The adaptability of the prefabricated panels cater for occupational shifts between long- and short-run production models, and flexible functions of possible offices and administrative multiple tenancy spaces.

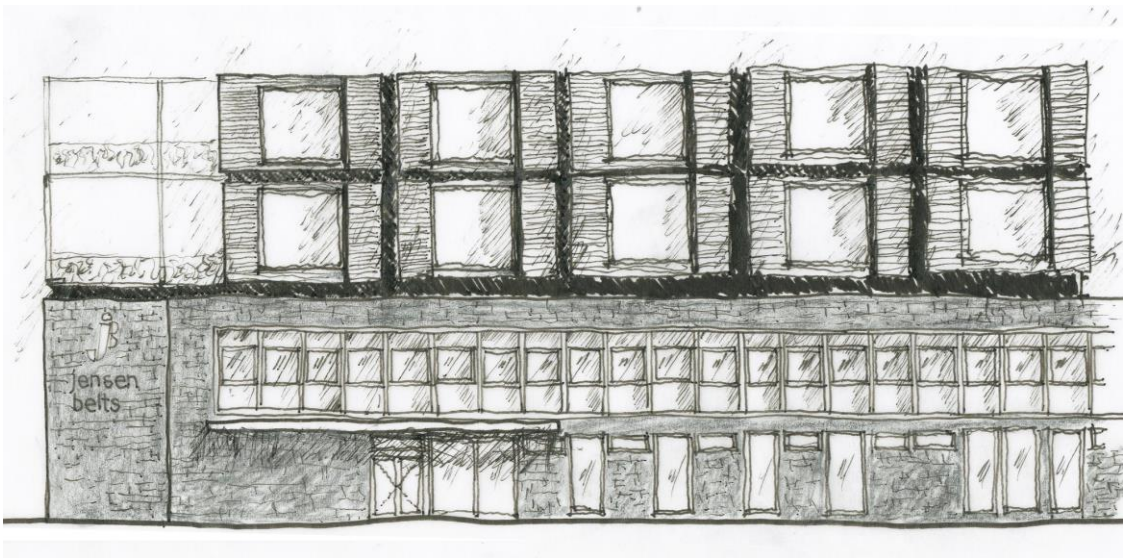


[67] 3D site model showing building intervention positioned at intersection.

CONCLUDING THOUGHTS

A new industrial typology should provide utility and quality in terms of a space that can be used over time, to avoid it reaching a state of redundancy. The spatial resource is experienced through the transitioning of space into the occupation of the industrial site. This is limited in found industrial sites that house the ground floor as a tunnel of manufacture. Tearing the envelope at strategic locations allows the user to experience the progressist enclosure of industry, while adapted with culturalist influences of connectivity.

Elevating industry into a Vertical Factory typology highlights the ground floor, and the tower as a beacon of industrial significance in the city.

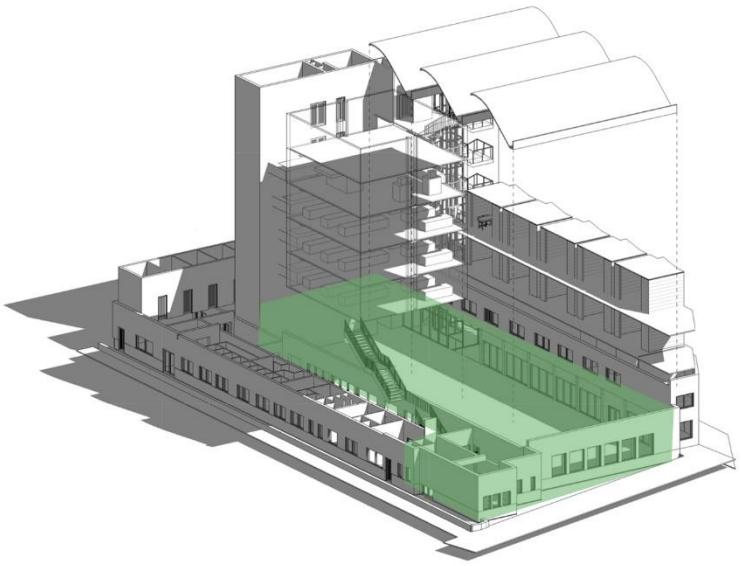


[68] Adapted Beach Road façade, indicating the bold industrial motif dictating the form of envelope punctures and pod forms.

APPENDIX

RELEVANT BUILDING REGULATIONS

MAIN PUBLIC SPACE
652m2



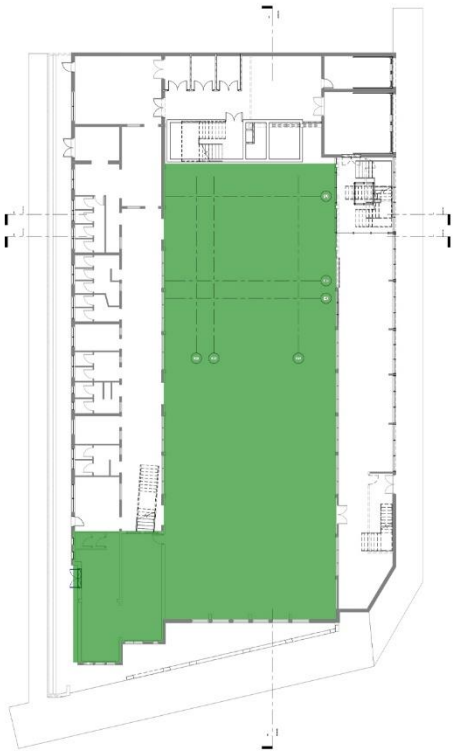


Table 6 — Provision of sanitary fixtures for personnel

1	2	3	4	5	6
Population[a]	Number of sanitary fixtures to be installed				
	Males			Females	
number of people	Toilet pans	Urinals	Wash-hand basins	Toilet pans	Wash-hand basins
≤ 15	1	1	1	2	1
> 15 ≤ 30	1	2	2	3	2
> 30 ≤ 60	2	3	3	5	3
> 60 ≤ 90	3	5	4	7	4
> 90 ≤ 120	3	6	5	9	5
> 120	Add 1 sanitary fixture to the above for every 100 persons			Add 1 sanitary fixture to the above for every 50 persons	Add 1 sanitary fixture to the above for every 100 persons

NOTE If the facilities provided in a shopping complex can be conveniently situated so that they are available to the personnel and the public and visitors, it might not be necessary to provide separate facilities for the personnel in individual shops. The minimum number of facilities provided should then be the total required in accordance with this table for the total number of personnel in the shops within the complex who make use of these facilities.

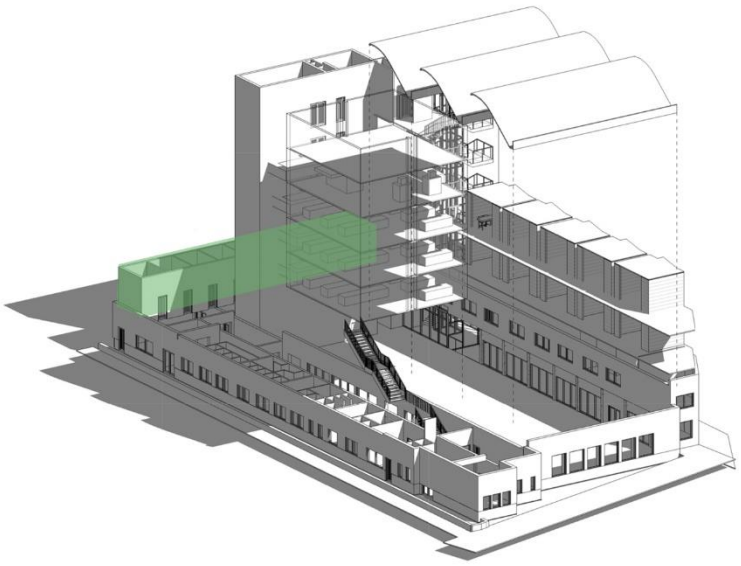
[a] Population is the number of personnel only of a particular sex in an occupancy. The total number of personnel will, in some cases, be the total population obtained from Regulation **A21**, the public and visitors being very few in number. In other cases the proportion of personnel to the public and visitors will have to be established. The total number of personnel in a shopping complex, or in any particular shop, may be taken as 10 % of the total population for such complex or shop calculated in terms of Regulation **A21**.

Table 4 — Provision of sanitary fixtures

1	2	3
Type of occupancy and population	Fixtures	Exceptions
A1: Personnel Public and visitors	See table 6 Males: 1 toilet pan, 1 washbasin Females: 1 toilet pan, 1 washbasin	1. In any building where facilities in accordance with table 6 are available to both personnel and the public or visitors, no separate facilities shall be required for the public or visitors.

SAME AS ABOVE FOR D3, B3, F2

A1 GENERAL ENTERTAINMENT/PUBLIC ASSEMBLY
D3 LOW RISK INDUSTRIAL SERVICE
B3 LOW RISK COMMERCIAL
F2 SMALL SHOP



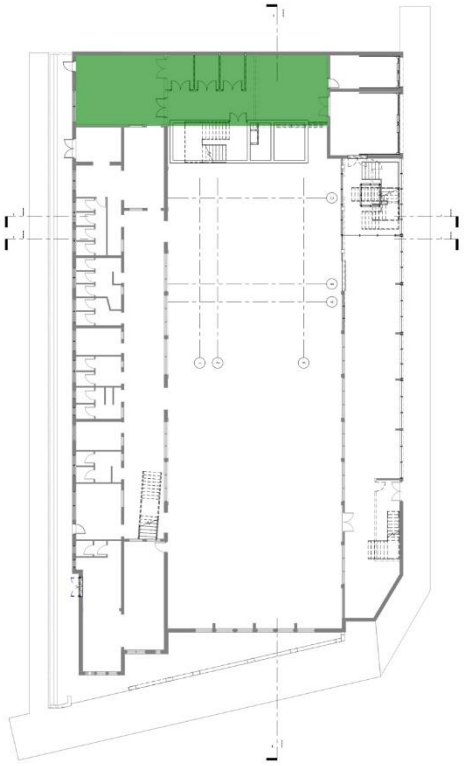


Table 6 — Provision of sanitary fixtures for personnel

1	2	3	4	5	6
Population[a]	**Number of sanitary fixtures to be installed**				
	Males			**Females**	
number of people	**Toilet pans**	**Urinals**	**Wash-hand basins**	**Toilet pans**	**Wash-hand basins**
≤ 15	1	1	1	2	1
> 15 ≤ 30	1	2	2	3	2
> 30 ≤ 60	2	3	3	5	3
> 60 ≤ 90	3	5	4	7	4
> 90 ≤ 120	3	6	5	9	5
> 120	Add 1 sanitary fixture to the above for every 100 persons			Add 1 sanitary fixture to the above for every 50 persons	Add 1 sanitary fixture to the above for every 100 persons

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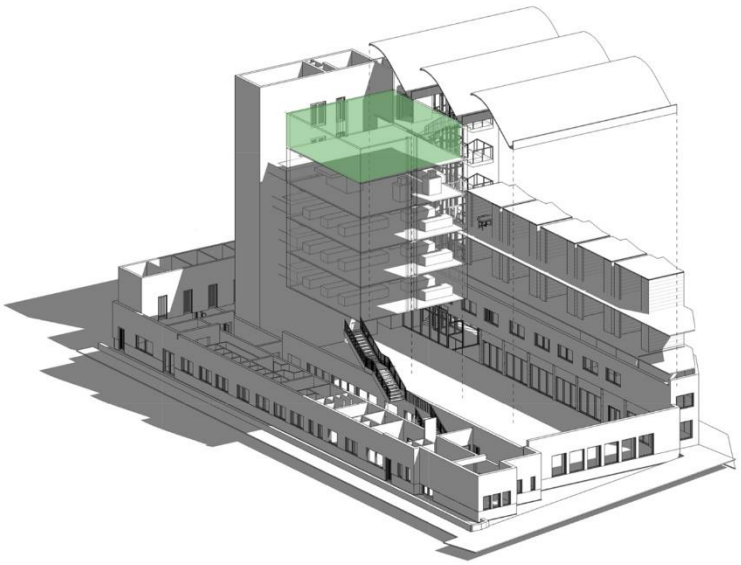
Table 4 (*concluded*)

1	2	3
Type of occupancy and population	**Fixtures**	**Exceptions**
G1: Personnel	See table 6	(see above)
Public and visitors	Males: 1 toilet pan 1 washbasin	
	Females: 1 toilet pan 1 washbasin	



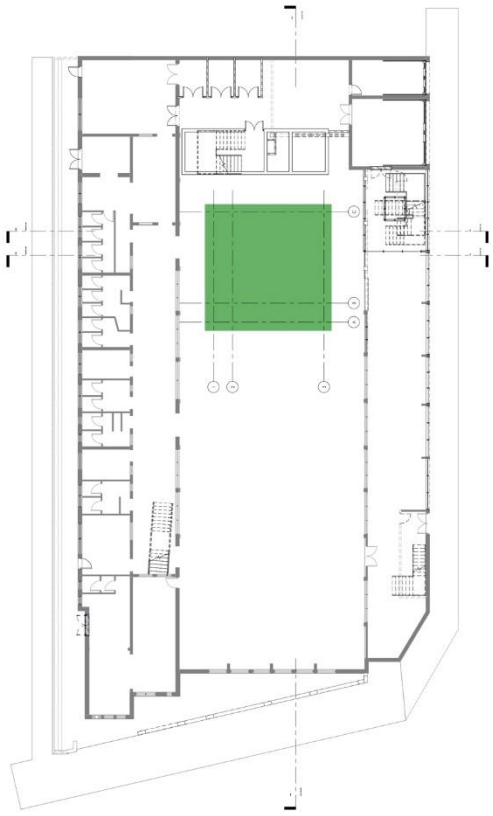


Table 6 — Provision of sanitary fixtures for personnel

1	2	3	4	5	6
Population[a] number of people	**Number of sanitary fixtures to be installed**				
	Males			**Females**	
	Toilet pans	**Urinals**	**Wash-hand basins**	**Toilet pans**	**Wash-hand basins**
≤ 15	1	1	1	2	1
≤ 30	1	2	2	3	2
≤ 60	2	3	3	5	3
≤ 90	3	5	4	7	4
≤ 120	3	6	5	9	5
> 120	Add 1 sanitary fixture to the above for every 100 persons			Add 1 sanitary fixture to the above for every 50 persons	Add 1 sanitary fixture to the above for every 100 persons

NOTE If the facilities provided in a shopping complex can be conveniently situated so that they are available to the personnel and the public and visitors, it might not be necessary to provide separate facilities for the personnel in individual shops. The minimum number of facilities provided should then be the total required in accordance with this table for the total number of personnel in the shops within the complex who make use of these facilities.

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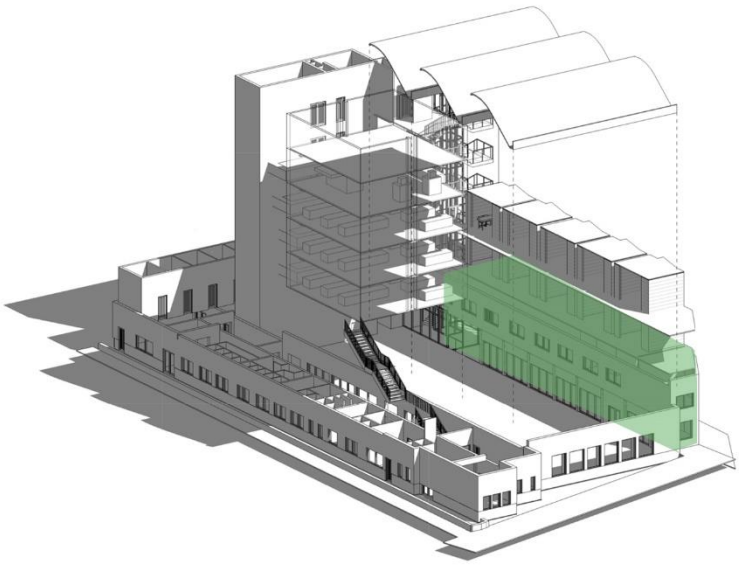
Table 4 — Provision of sanitary fixtures

1	2	3
Type of occupancy and population	**Fixtures**	**Exceptions**
A1: Personnel	See table 6	1. In any building where facilities in accordance with table 6 are available to both personnel and the public or visitors, no separate facilities shall be required for the public or visitors.
Public and visitors	Males: 1 toilet pan, 1 washbasin	
	Females: 1 toilet pan, 1 washbasin	

WORKSHOP
150m2 X 2



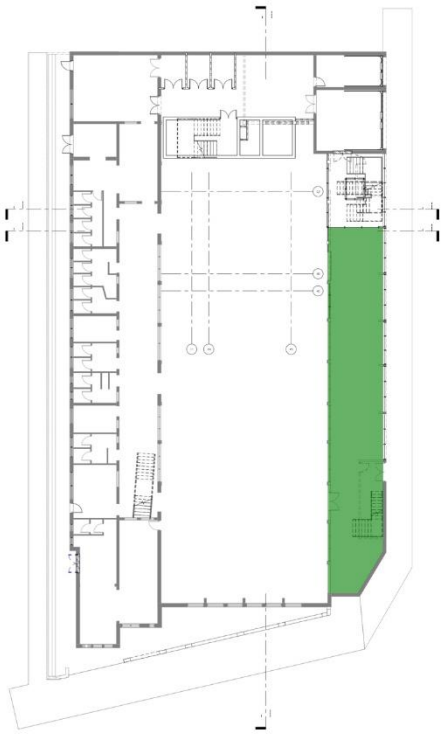


Table 6 — Provision of sanitary fixtures for personnel

1	2	3	4	5	6
Population[a] number of people	**Number of sanitary fixtures to be installed**				
	Males			**Females**	
	Toilet pans	**Urinals**	**Wash-hand basins**	**Toilet pans**	**Wash-hand basins**
≤ 15	1	1	1	2	1
> 15 ≤ 30	1	2	2	3	2
> 30 ≤ 60	2	3	3	5	3
> 60 ≤ 90	3	5	4	7	4
> 90 ≤ 120	3	6	5	9	5
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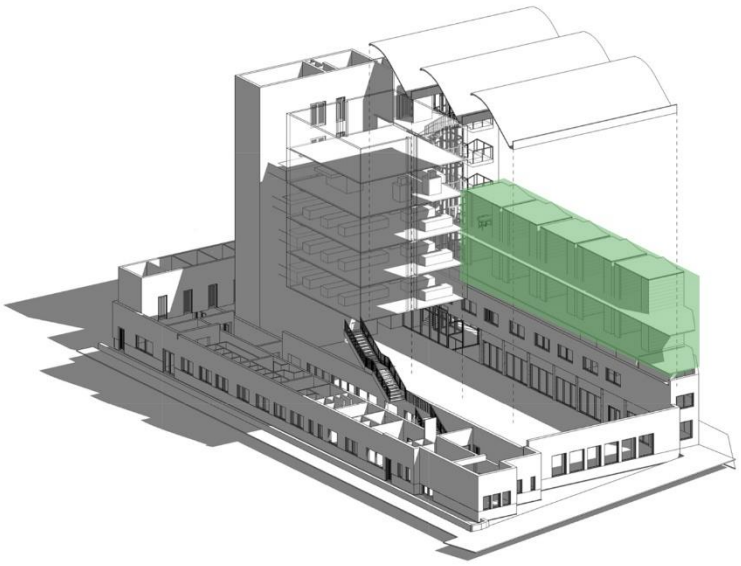
D1, D2 and D3:	
Personnel	See table 6
Public and visitors	No separate provision required

CLASSROOMS
150m2 X 2



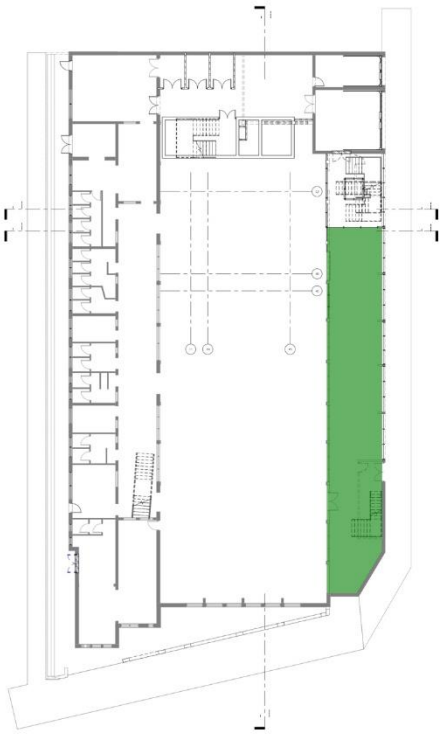


Table 6 — Provision of sanitary fixtures for personnel

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≤ 30	1	2	2	3	2
≤ 60	2	3	3	5	3
≤ 90	3	5	4	7	4
≤ 120	3	6	5	9	5
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IMAGE CREDITS AND SOURCES

All images are provided by Author, 2017 unless otherwise stated.

Figures 5, 51
Modified by the author, Image/Map from NGI

Figure 8
Modified by Author
Zoning image retrieved from: http://emap.capetown.gov.za/EGISPbdm/

Figure 12
Image from Correa (1989)

Figure 17
Image created by Author (2017), informed by Fine (2017)

Figure 18
Image retrieved from: http: //www.ctnuh.org/Portals/0/events/2013/AtlanticYardsB2/B2_ModularSequencing

Figure 19
Image from Emmitt and Gorse (2014)

Figure 24
Image created by Author (2017), informed by Burge (2017)

Figure 40, 41
Image created by Author (2017, informed by Worthington and Eley (1984)

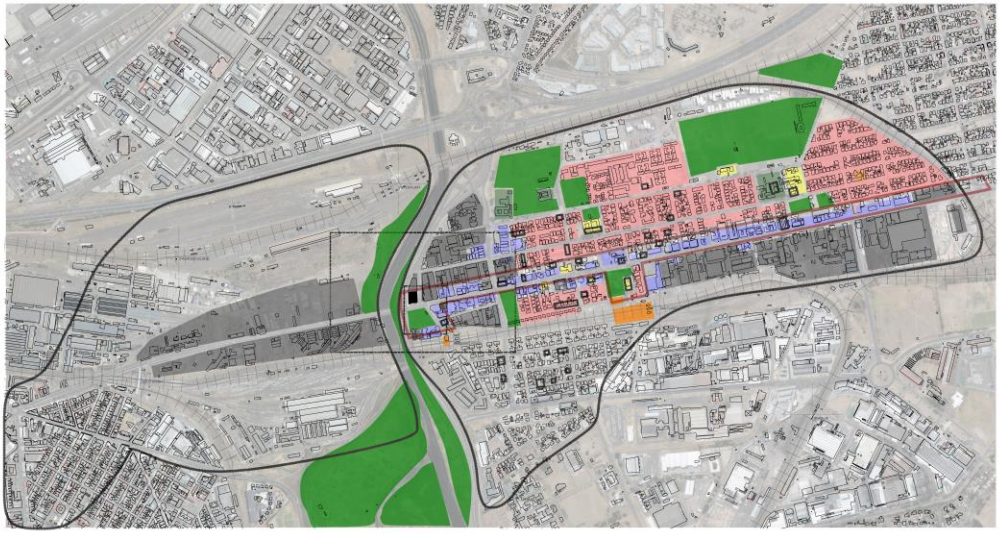
Figure 42
Image from https://www.google.co.za/maps/@-33.9243359,18.4777954,3a,60y,321.83h,87.37t/data=!3m6!1e1!3m4!1sgUx6fg14KRZZ8bI60B69Kw!2e0!7i13312!8i6656

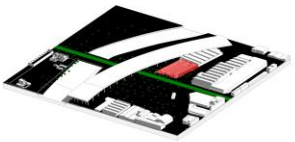
Figure 43, 44, 47, 52
Modified by Author (2017), Image retrieved from https://www.google.co.za/maps/place/Maitland,+Cape+Town,+7404/@-33.9241505,18.4769681,537m/data=!3m1!1e3!4m5!3m4!1s0x1dcc5c6704f82b65:0x78920bf352a0d24f!8m2!3d-33.9206184!4d18.5032788

Figure 46
Image retrieved from Syndicate (2014)

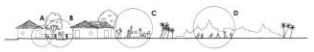
Figure 48
Image retrieved from http://assemblestudio.co.uk/?page_id=5

Figure 53
Image from Emmitt and Gorse (1984)

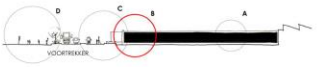




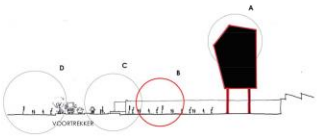
PROGRESSIST ELEMENTS IN ISOLATION - CONNECTED BY CULTURALIST VOORTREKKER ROAD



HIERARCHY OF SPACE IN RURAL INDIA (CORREA)

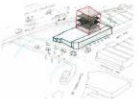


EXISTING HIERARCHY OF SPACE IN URBAN INDUSTRIAL MAITLAND



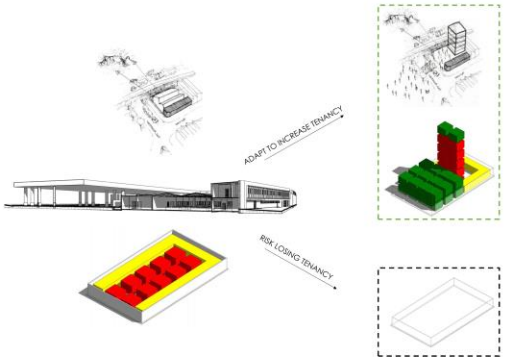
PROPOSED HIERARCHY OF SPACE IN URBAN INDUSTRIAL MAITLAND

A. Private Use
B. Space of Intimate Contact
C. Neighbourhood space
D. Principle Urban Area



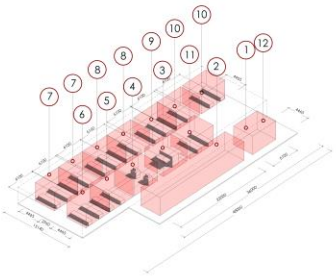
INTEGRATING THE FACTORY INTO HIERARCHY OF URBAN LIVING

TEARING THE ENVELOPE:
FROM TUNNEL TO TOWER INDUSTRIAL TYPOLOGY

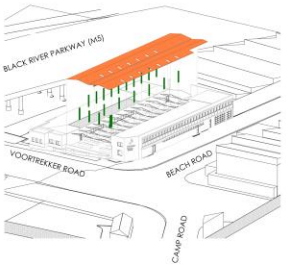


JENSEN BELTS SINGLE -TENANCY TUNNEL TYPOLOGY

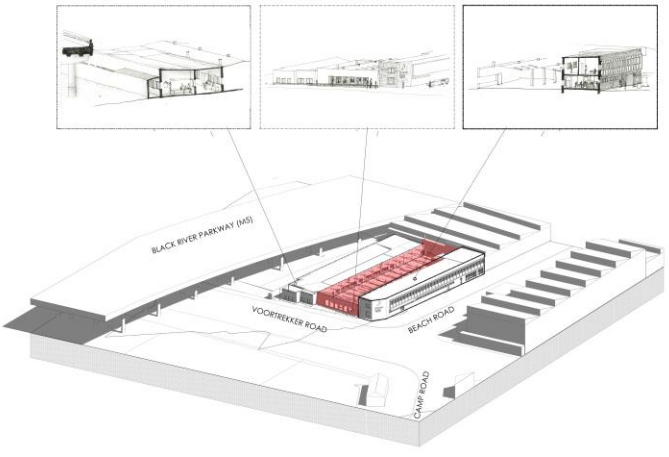
1. GOODS RECEIVING
2. STORE/SORTING FOR PERCENTAGE LAYOUT
3. CUTTING
4. CLICKING
5. PRODUCTION - SKIVING
6. PRODUCTION - EDGE PAINTING
7. HANDMADE COMPONENTS
8. SAMPLING
9. STITCHING
10. CLEANING
11. QUALITY CONTROL
12. DISPATCH



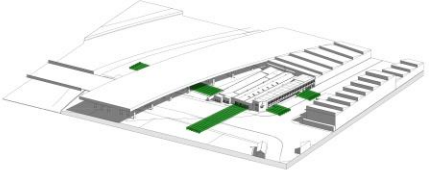
EXISTING JENSEN BELTS LONG-RUN PRODUCTION LINE



REMOVE ROOF



EXISTING JENSEN BELTS PROGRAM RESULTING IN RIGID ENVELOPE

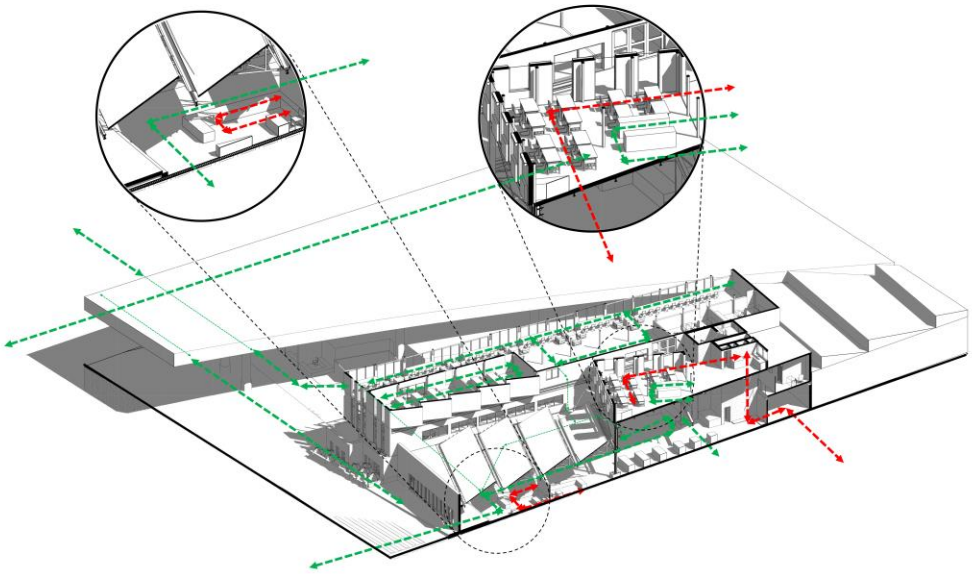


INTENTION OF SITE PERMEABILITY

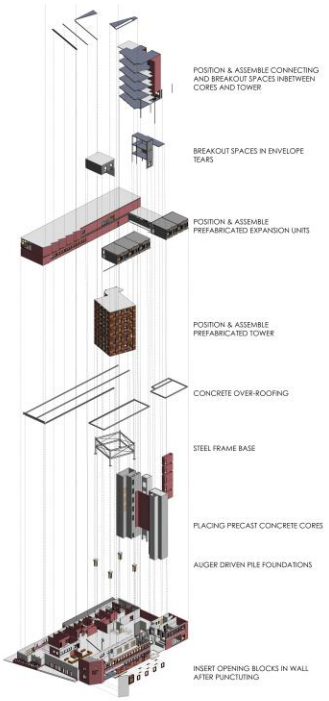
JENSEN BELTS NOT RESPONDING TO DESIRED URBAN ACTIVITY

SITE PLAN
1:5000

- MARKED FOR HIGH DENSITY DEVELOPMENT
- MARKED FOR MEDIUM DENSITY DEVELOPMENT
- RECREATIONAL SPACE
- DOMINANT DIRECTIONAL ROUTE
- BUILDINGS 3 STOREYS OR TALLER

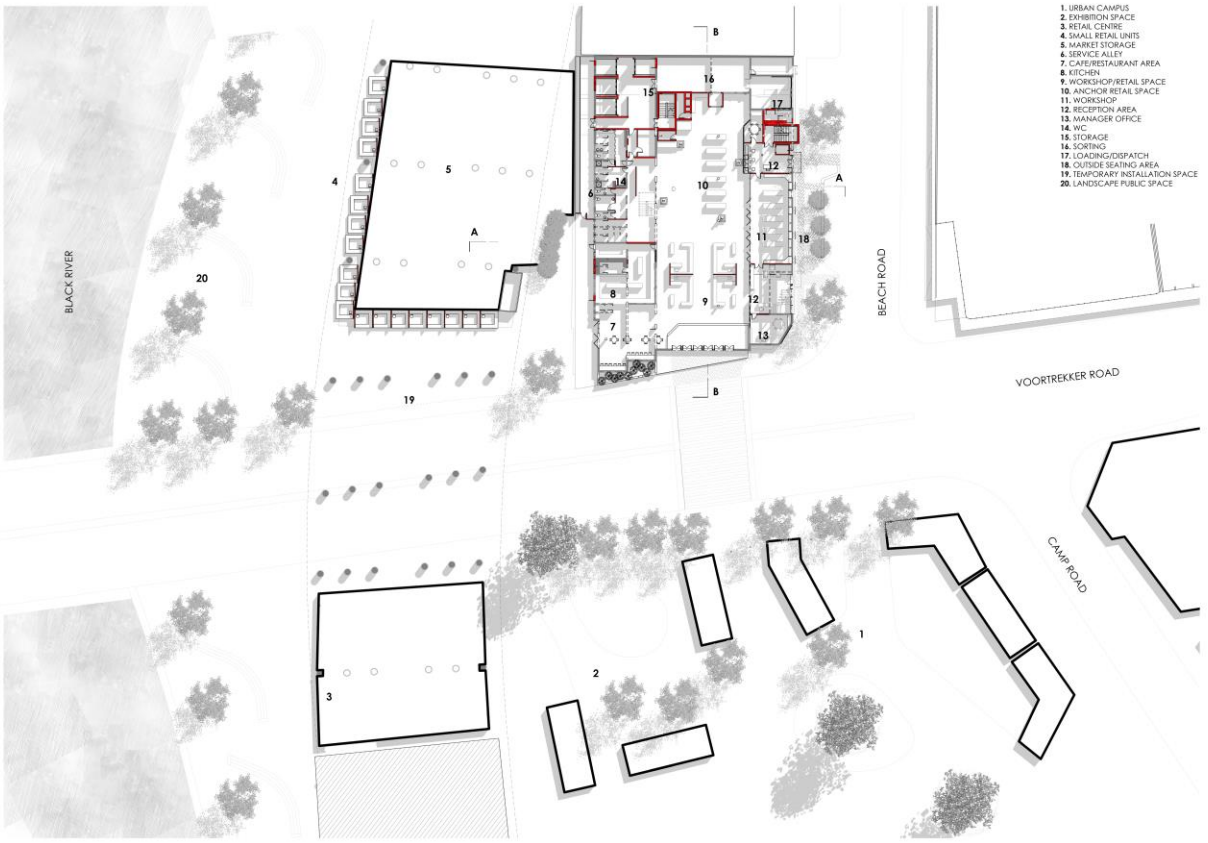


NEW INDUSTRIAL TYPOLOGY EXPANSION.
RAISED MANUFACTURE INTRODUCES VERTICAL SYSTEMS THAT ARE INTEGRATED.



COMPLETE SITE

CIRCULATION OF VEHICLES
CIRCULATION OF GOODS
CIRCULATION OF PEOPLE

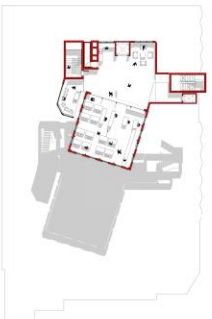


GROUND PLAN
1:200

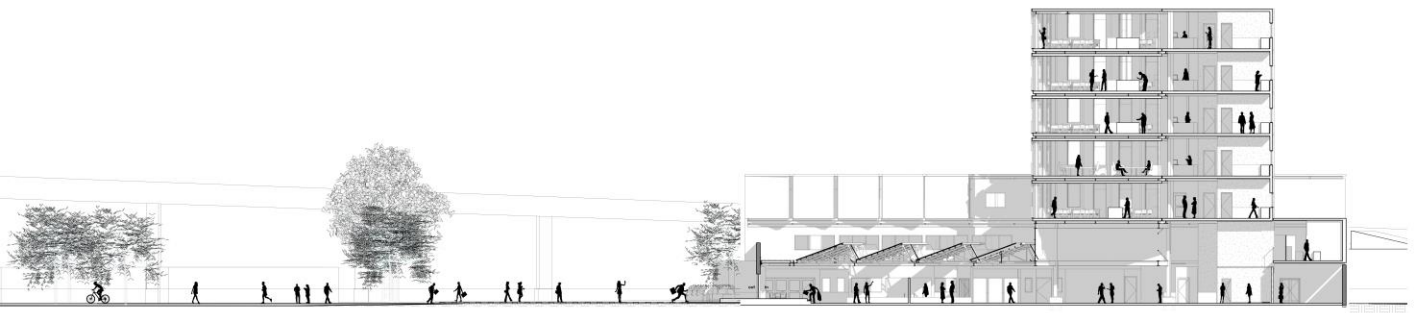
FIRST FLOOR ADMIN
1:200

FIRST FLOOR MANUFACTURE
1:200

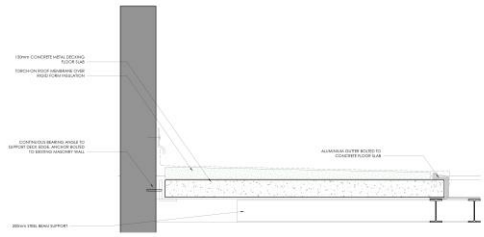
SECOND FLOOR MANUFACTURE
1:200



TYPICAL TOWER FLOOR
1:200

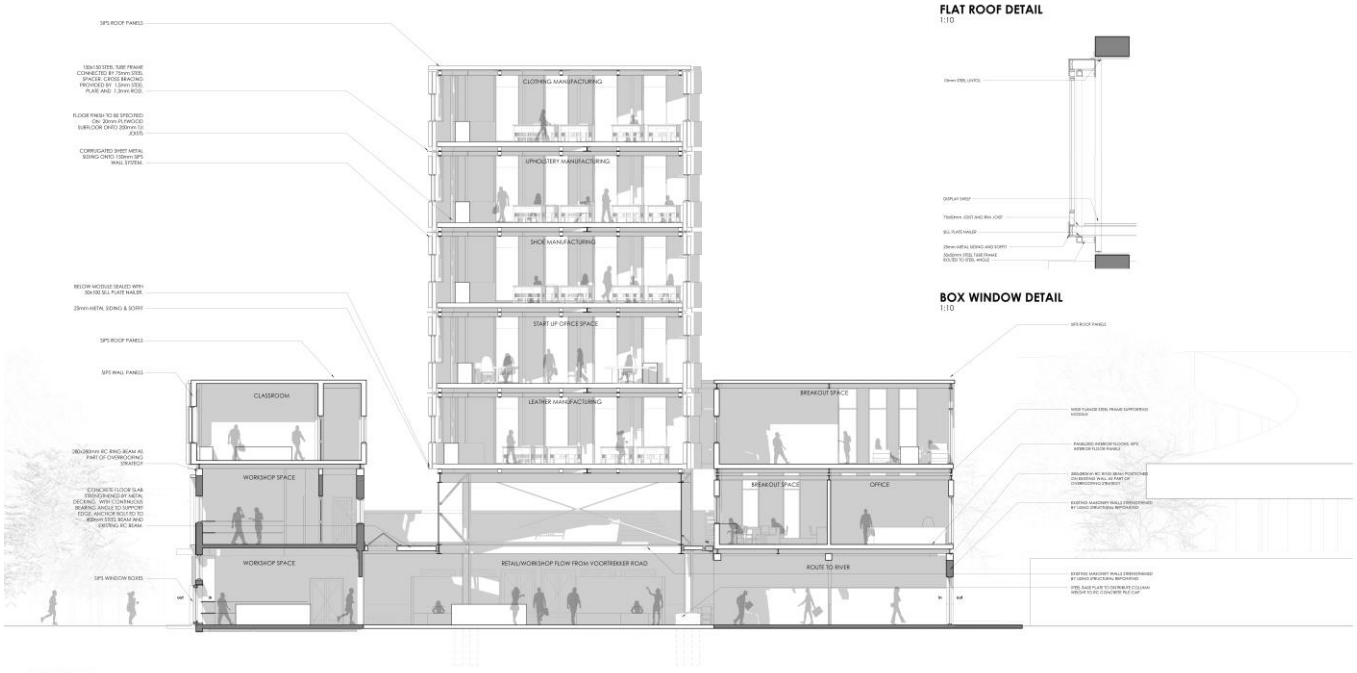


SECTION B-B
1:100

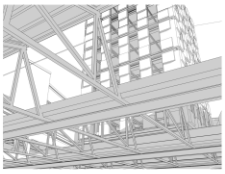


FLAT ROOF DETAIL
1:10

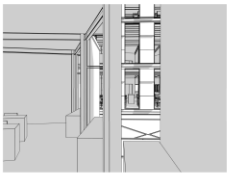
BOX WINDOW DETAIL
1:10



SECTION B-B
1:50



VIEW FROM ENTRY
1:100



VIEW FROM CLASSROOMS
1:100

BEACH ROAD ELEVATION
1:100

VOORTREKKER ELEVATION
1:100

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data.The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook**(available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		**IVOR SAVILLE**
Department		Architecture, Planning and Geomatics
Preferred email address of applicant:		svlivo001@myuct.ac.za
If a Student	Your Degree: e.g., MSc, PhD, etc.,	March (Prof)
	Name of Supervisor (if supervised):	Stella Papanicolaou
If this is a researchcontract, indicate the source of funding/sponsorship		
Project Title		TEARING THE ENVELOPE. ADAPT TO INTEGRATE.

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

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

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	**IVOR SAVILLE**		28/07/17

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	**STELLA PAPANICOLAOU** Click here to enter text.	Signed by candidate	28/07/17
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours).	Click here to enter text.	Signed by candidate	28/07/17
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	G SITHOLE Click here to enter text.	Signed by candidate	2 AUG 2017 Click here to enter a date.