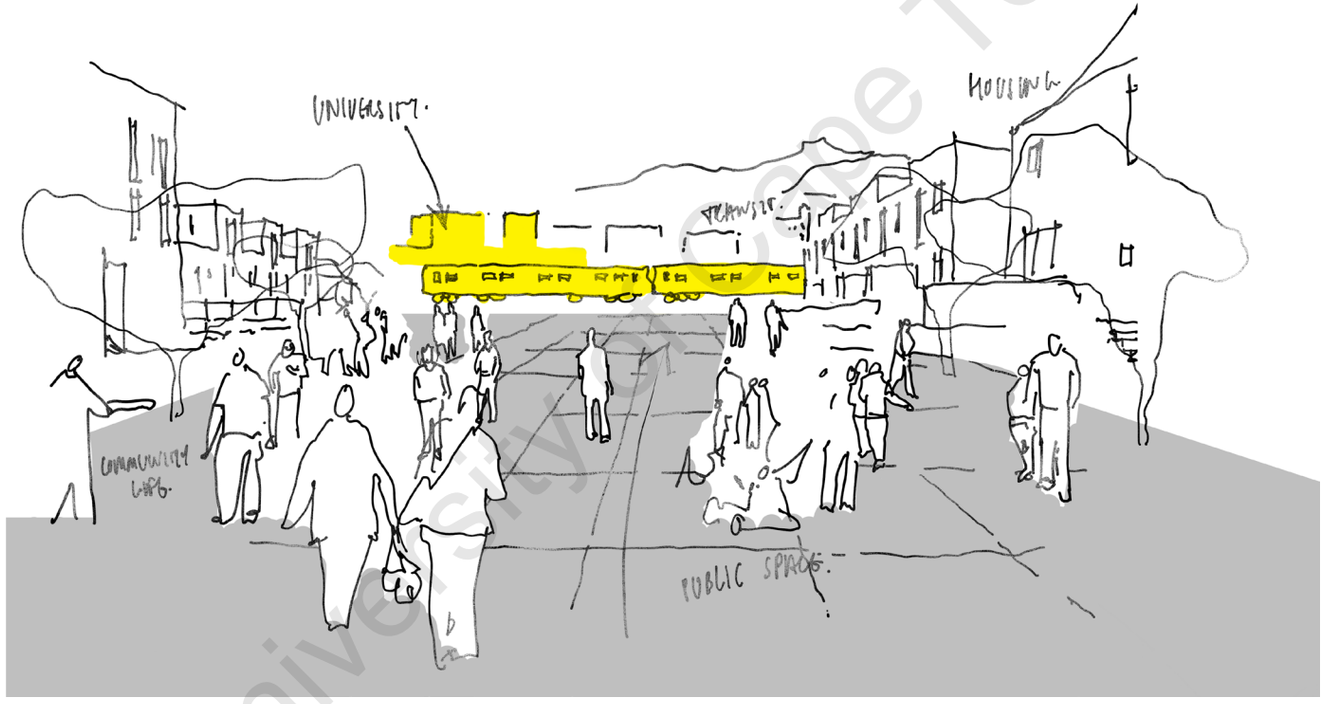
MOVING MINDSETS

A MULTIDIMENSIONAL INQUIRY INTO URBAN JUSTICE THROUGH THE LENS OF URBAN MOBILITY AND THE EVOLUTION OF PUBLIC SPACE



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School of Architecture, Planning & Geomatics I University of Cape Town
Masters of Architecture (Professional)
Design Dissertation
Supervisor I Alta Steenkamp

University of Cape Town

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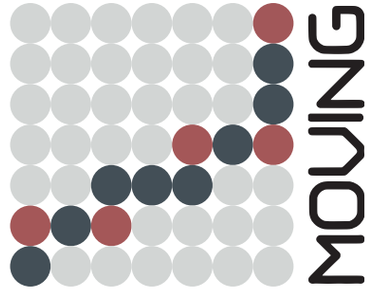

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This paper is presented as part fulfillment of the degree of
Master of architecture (Prof) in the school of
Architecture, Planning and Geomatics
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Plagiarism Declaration

DISSERTATION TITLE: MOVING MINDSETS: A MULTIDIMENSIONAL INQUIRY INTO URBAN JUSTICE THROUGH THE LENS OF URBAN MOBILITY AND THE EVOLUTION OF PUBLIC SPACE

STUDENT NAME: Saliegh Davis

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This paper 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

DATE: August 2023

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Preface

A Personal Journey & a Global Problem

As a teenager, I discovered the joys of navigating the city on a second-hand skateboard gifted to me by my eldest cousin. It wasn't the most glamorous, nor efficient mode of transport, but it was my ticket to freedom, adventure and a City of Opportunities. I would explore the city's hidden corners and connect with friends. We revelled in the laughter and conversations shared among each other, and the sense of freedom that came with breaking free from the confines of our working-class neighbourhood. This simple mode of transport was not only my means of getting to school, but it also granted me access to new experiences, and allowed me to engage with my surroundings and develop a deeper understanding of the city I call home.

My journey on that skateboard introduced me to the transformative power of transportation in connecting people and places. In modern cities, like Cape Town, transportation has shaped their development throughout history. From pre-colonial pastoralist movements to the ambitious colonial projects that aimed connect continents, the ever-evolving narrative of transportation has left an indelible mark on the urban landscape.

However, the narrative of transportation in South Africa carries a heavy shadow. Its planning, once employed as an apparatus of the apartheid regime, segregated communities, facilitated racial oppression, and perpetuated economic inequalities. The architecture of this system, characterised by commuter dormitory towns and inner-city workplaces, is an enduring legacy of apartheid. Decades after the end of apartheid, the effects of this discriminatory planning remain deeply entrenched in the city's structure with few signs of meaningful change.

Despite the importance of public transportation in moving people and goods from one point to another, the planning process often lacks imagination beyond its engineering. Considering that roads and streets occupy more than 80% of public space in many cities (Anon, 2013), built environment professionals must recognise the potential of these spaces to offer more than just functional connections. They can provide opportunities for diverse experiences and enrich the lives of those who inhabit them.

Access to a city's opportunities is a fundamental right, one that transportation planning can enhance. Beyond solving the technical problem of moving people from point A to B, it carries the promise of addressing the structural fragmentation in cities like Cape Town. Investment in public transport isn't merely a logistical endeavour but a potential remedy for the city's socio-spatial inequities. The challenge isn't just about "moving people," it's about changing mindsets and ushering a sense of dignity, equity and inclusivity along the ride – a testament to the intent behind the design.

Abstract

Like the freedom and discovery found on the worn wheels of my skateboard in my teenage years, this dissertation seeks to bring a similar spirit of exploration and connectivity to the Pentech Metrorail Station in Belhar. My personal journey, intersecting with the broader complexities of South Africa's transportation narrative, led me to the threshold of this project.

Inspired by my own experiences and driven by the transformative potential of transport systems, the focus is the revitalisation of the Pentech Metrorail Station, envisaging an integrated transport node that incorporates a vocational education centre and community information and resource centre. Emphasising the Cape Peninsula University of Technology's (CPUT) role and public realm vitality, the goal is to make the station a key node in the Belhar community, thereby nurturing vibrant and accessible public spaces that heighten the quality of life for all residents and users.

The major routes linking the train station and the urban fabric are critically assessed and reconfigured to cater not only to the station but also to thoughtfully integrate public spaces and accommodate the evolving needs of the local populace with the ambition of enabling the local populace to explore their city through improved movement routes. The public spaces are designed as dynamic platforms to promote social cohesion, community identity and facilitate academic interaction.

The theoretical investigation of the project delves into the profound influence of architectural and urban design on social behaviour particularly in respect to how users interact in public spaces. These relationships are investigated in order to create an architectural design that responds effectively to present conditions and simultaneously emerges as an important landmark in Belhar and a template for future developments in the area in alignment with the Metropolitan Spatial Development Framework's (MSDF) proposed North-South link.

The Pentech Metrorail Station, despite its strategic position within one of Belhar's most active and social academic nodes, had previously been overlooking and neglected, leading the station into disrepair. The renewed Pentech Metrorail Station is intended to improve connectivity for locals and for the university community, offering an affordable commuting option to Cape Town CBD, a frequent destination for work and academic opportunities for Belhar residents.

The essence of the design is concentrated on the integration between rail, road and pedestrian transport, vibrant public spaces, safe streets and the higher education community within the New Belhar area. The revamp of Pentech and the reassessing of the Belhar transport network aims not only to reestablish the community's link to the railway network but also to reintroduce the much-needed vitality, safety and academic vibrancy to Belhar.

Central to the design intent is the enhancement of the public realm as a crucial aspect of urban life, transforming it into a lively, inclusive and accessible space that truly serves its community and supports the academic aspirations of the CPUT students and faculty. This redesign signifies a strategic step towards consolidating the university's role in local community development and its commitment to fostering an inclusive, connected and sustainable urban environment.

Figure 1: Davis, S (2023). Photograph of Pentech Metrorail Station (Top)

Figure 2: Davis, S (2023). Aerial photograph of Pentech Metrorail Station (Bottom)

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Section 1 | Introduction

Introduction to Belhar

Belhar is a town whose growth potential has been significantly inhibited by inadequate and economically challenging public transportation infrastructure. The absence of an efficient transit network poses significant barriers to socio-economic opportunities within the area. Recognising this challenge, there is a substantial potential benefit to be derived from the activation and establishment of a dynamic, transit-oriented node. The creation of this critical node within the transit network is a pressing necessity to catalyse and sustain development in the area, aligning perfectly with the intention set out in the Metropolitan Spatial Development Framework (MSDF) for both the present and future.

The project proposes the integration and revitalisation of dormant transit and mobility networks within Belhar, to act as a catalyst for rejuvenation and structuring of the currently underutilised and dormant precinct. This project not only aligns with the MSDF's objectives but also positions these spaces as a launching pad for a more vibrant, interconnected and prosperous Belhar.

✚ commuter movement towards train station

✚ desire lines through vacant land

✚ Car-Oriented Urban Fabric & Pedestrian dominated Transit

✚ pedestrian movement in Belhar

Figure 2.1-2.4: Field Study Photographs, Belhar. (Source. Van Steenbrugge, S., 2012. Campus and the City)

Background & Context

Belhar, located approximately 25km East of the Cape Town CBD, is a dormant and underserved town in the Western Cape. Surrounded by prominent suburbs such as Belville, Delft and a distant neighbour to Khayelitsha, it finds itself separated from these zones by expansive buffer zones and undeveloped land. Its growth, or lack thereof is marked by its history as an area divided during the apartheid era which imparted a sense of isolation to the area.

Belhar's complex history is marked by fragmentation, forced relocation and a struggle for identity due to its classification under apartheid. Historically, Belhar was designed as a residential area primarily for the coloured community during apartheid, indelibly imparting a complex heritage. Nevertheless, the area's narrative is punctuated by moments of resilience, underlined by the growth of nearby academic institutions like the Cape Peninsula University of Technology (CPUT) and the University of the Western Cape (UWC).

Belhar's connection to the CBD and its proximity to the Cape Twon International Airport, make it an affordable settlement area for low-income and working-class citizens. However, the area's promise is tarnished by the unfortunate reality of inadequate commuter and public transit infrastructures, turning what should be routine commutes into economic hurdles for its residents.

News24 spotlighted the far-reaching implications of the severe cutback in the commuter train service tethering Belhar to the Cape Town CBD. As the NHTS survey conducted by Statistics SA reveals, this issue wasn't isolated to Belhar. In 2013, 700 000 South Africans, constituting 13% of the employed population, regularly depended on trains to commute. By 2020, the number plunged by nearly 80% to just 150 000 painting a bleak picture for the nations train reliance (Daniel, 2021).

Under 2.2% of the households surveyed across 65 000 dwelling units confessed that trains were their primary mode of transportation, a significant decrease from 8.9% in 2013. More specifically, in the Western Cape, train usage fell from over 10% of surveyed households in 2013 to a mere 3.1% in 2020 (Daniel, 2021).

This drastic shift had profound repercussions for Belhar's community. The small-scale commercial nodes that were once active and well-connected experiences a rapid descent into neglect as regular commuting dwindled. The resulting vacancies around the station further exacerbated the situation, leading to an uptick in illegal activities in the area. It therefore becomes imperative to address issues around safety and connectivity in the area while aligning the redevelopment plan with the unique needs of the Belhar community.

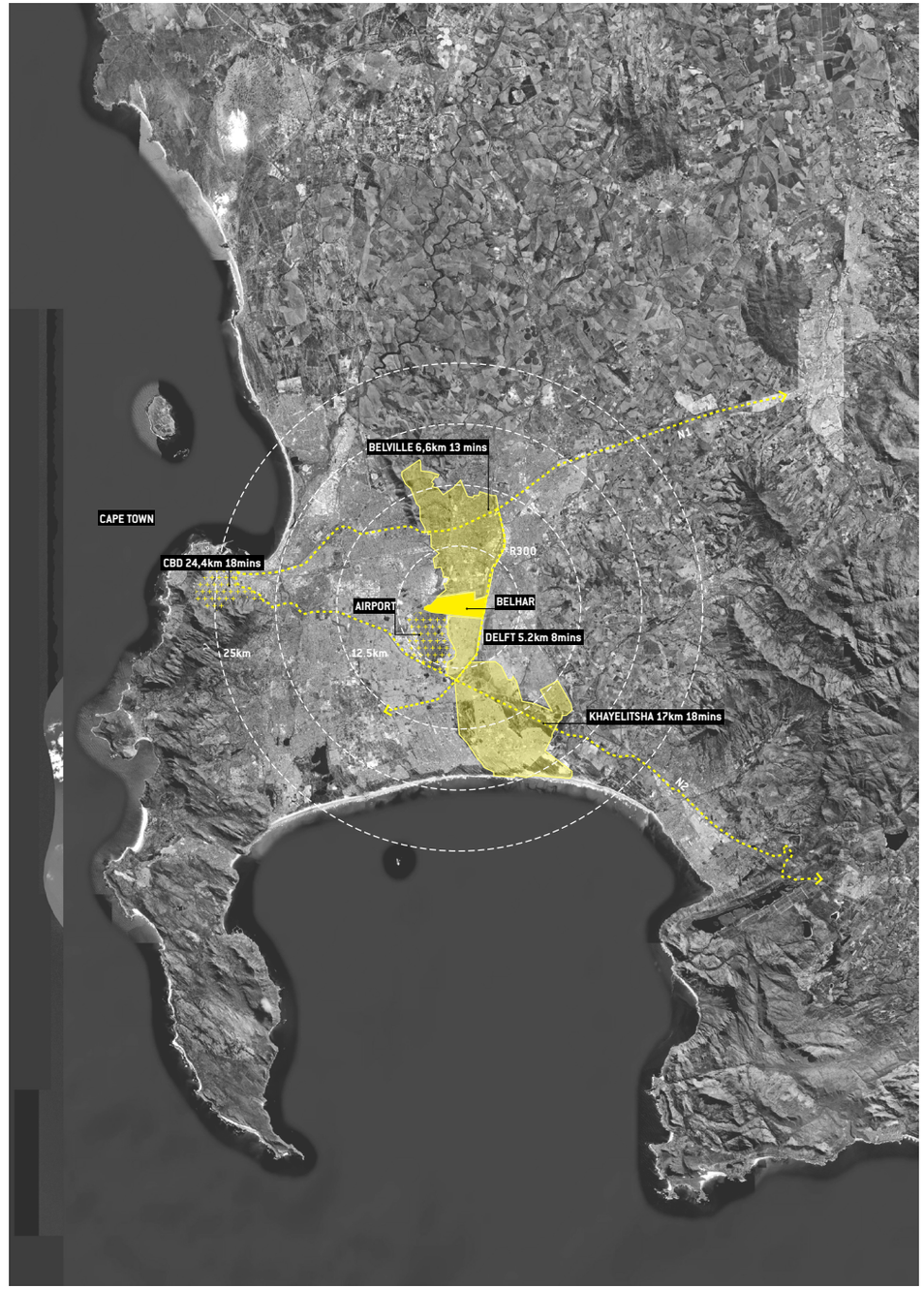


Figure 3: Davis, S (2023). Map locating Belhar in relation to Cape Town CBD and neighbouring communities

Figure 3.1-3.3: Davis, S (2023). Site & Contextual Photos

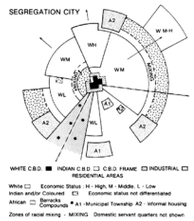
Section 2 | A History of Segregation

History of Segregation

Apartheid had a major impact on the form and structure of South African cities. Modern principles of segregation of functions were adopted to reinforce apartheid ideologies of racial segregation and land became the most valuable resource to invoke these methods of control.

Buffer Zones & Boundaries

Urban theorist, Michel Foucault proposed the concept of an urban panopticon – a form of controlled spaces which came to life in the blueprints of the apartheid city as isolated spaces that could be easily controlled and observed, not laden with harsh restrictions, but neatly demarcated by defined boundaries and structured entry points (Robinson, 1992). This panopticon was crafted with separate racial zones arranged in a radial pattern, buffered by elements like roads, railways or large stretches of vacant land. This formation fostered a sense of isolation in each racial enclave, discouraging racial interaction and limiting free movement across diverse racial areas.



When it came to incorporating this radial layout into Cape Towns masterplan, the idea of circumferential routes were set aside, claiming that the existing north-south and east west grid provided far greater accessibility (Robinson, 1992). A new railway line was implemented that would forge a connection between Athlone and Nyanga and aimed to bridge the gap between non-white urban areas and was subsequently extended towards Philippi, branching out to Mitchells Plain (coloured) and Khayelitsha (black) racial areas, and thereby discouraging racial interaction (Committee, 1967).

As for Belhar, it was the industrial sectors and railway track stretching from Cape Town to Belville that served as buffers between the coloured and white racial areas. According to the Belhar Guideplan (Comdev, 1972), this railway track played a dual role; it facilitated effective mass transportation, and also imposed restrictions on the coloured residents of Belhar, limiting their use of the Belville station, which was designated for Whites.

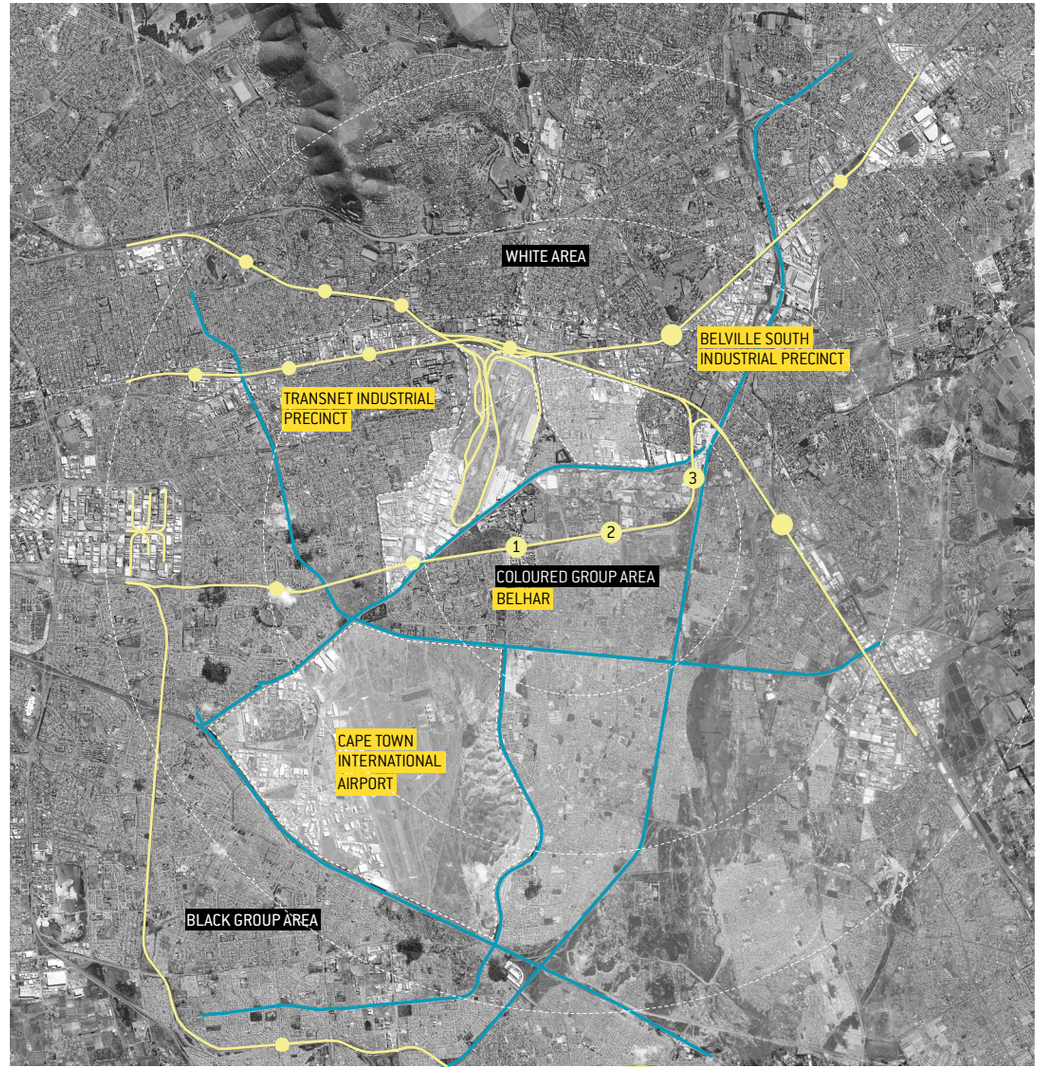


Figure 4: Davis, S (2023). Map locating Belhar in relation to Cape Town CBD and neighbouring communities
Figure 5: Davis, S (2023). Mapping buffer zones in Belhar
Figure 6: Segregation City. (Source. Davies, R.J., 1981. The spatial formation of the South African city. In Geojournal, 1981, Supplementrary Issue 2: Southern Africa pp. 64)

Figure 6.1: Segregation: Apartheids Legacy (Source: Unequal Scenes: Apartheid's legacy, 2021).

Understanding Ethnic Divisions and the Transformation of Belhar

Under apartheid, the goal of the urban panopticon principle was to accomplish full racial segregation, thereby designating zones for living and development tailored to each ethnic group. This was realised through the Group Areas Act, which implemented a 'Self-containment' strategy aimed at creating controlled and isolated spaces at a precinct scale.

The 1972 Belhar Guideplan drew upon this concept during the development of Belhar. It aimed to build a new town solely for the coloured community, anticipating a population ranging from 50 000 to 70 000. This area was planned to have all essential facilities, including a city centre, job opportunities and public amenities. The close location of Belhar to UWC was also a factor, enabling it to provide support for the university hospital.

Meanwhile, the Cape Flats area was earmarked to offer a wide spectrum of employment, shopping, services, recreational and cultural prospects, provisions were also in place for higher education facilities, with the belief that universities segregated by ethnicity could facilitate better community upliftment. As a consequence of the Group Areas Act, a sperate university for the coloured community, UWC was established within the Cape Flats. This development imposed limitations on students, barring them from attending universities that were previously open to them, like the University of Cape Town (UCT).

The first planned area of Belhar, Erica was designed in 1969 and was primarily aimed at serving the middle-class population. It was developed as a residential area for employees of the then-new University of the Western Cape (UWC) and Cape Peninsula University of Technology (CPUT).

In the years that followed, the development of other roads and infrastructure further reshaped Belhar's spatial character. As arterial roads such as the Stellenbosch Arterial and R300 and secondary streets merged, they introduced a new spatial dynamic to the area. Most notably, fast-paced arterial roads had a role in isolating Belhar from surrounding communites.

A key event in Belhar's spatial evolution was the disconnection of the cement railway. This previousl significant infrastructure route was rendered obsolete, leading to a considerable shift in the area's spatial dynamics. The disconnected railway line not only physically divided the town, but also marked a change in the urban movement patterns within Belhar

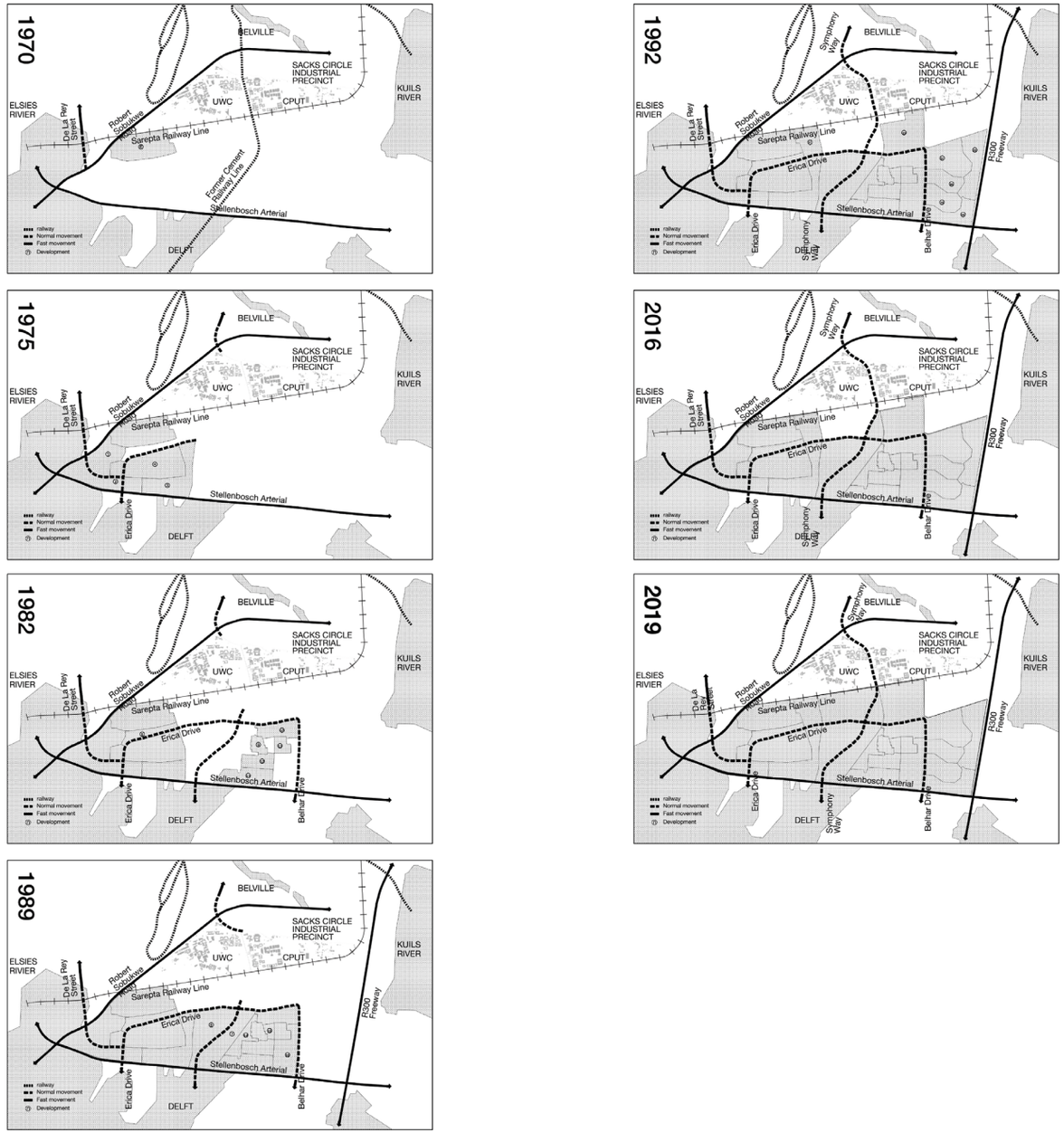


Figure 7: Davis, S (2023). Mapping the development of Belhar over the years

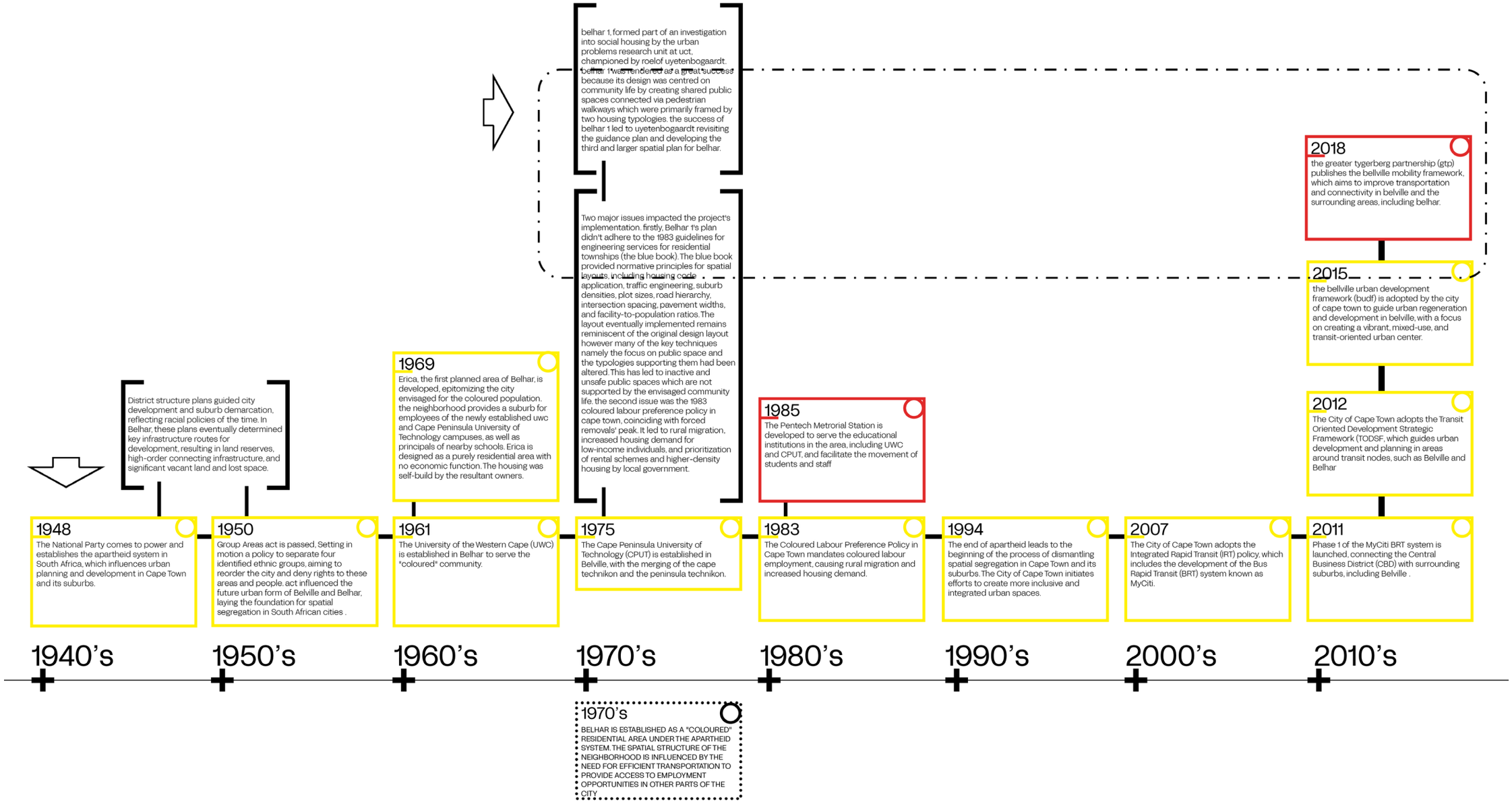


Figure 7.1: Davis, S (2023). Historic Timeline of Belhar

Belhar Masterplan

The Belhar masterplan was based on the social engineering principles of the apartheid era. Anticipating an increase in vehicular traffic, in line with social engineering practices of the time, the primary focus was centred on enhancing the network of local and arterial roads, situated within the wider transport network, initial designs reflected these basic principles with the intricate details of the transportation system left for further development in the project's later stages.

The final masterplan embraced a fundamental grid layout, similar to the practical and efficient layout of common residential neighbourhoods. Housing areas were distinctly outlined by major routes, creating easily identifiable zones within its landscape. These sections were later designed to be imbued with communal spaces or local amenities at their heart, utilising a 'pinwheel' concept (Uytenbogaardt, 1978). Each residential quadrant, featured four roads radiating from central squares or schools to integrated with neighbouring quadrants. Intersections between these quadrants were designated for additional services like daycare centres or churches, epitomising the ambition to serve larger communities and adapt to evolving demographic patterns (Uytenbogaardt, 1978).

The design highlighted rectangular blocks and straight roads, devised for easy navigation and a clear understanding of the surroundings. Uytenbogaardt's initial report accentuated the variety of environmental zones within each section, thus providing diverse housing options and adding to the visual appeal of the residential structure. Each segment spread from a central public space of 60m x 60m to its periphery.

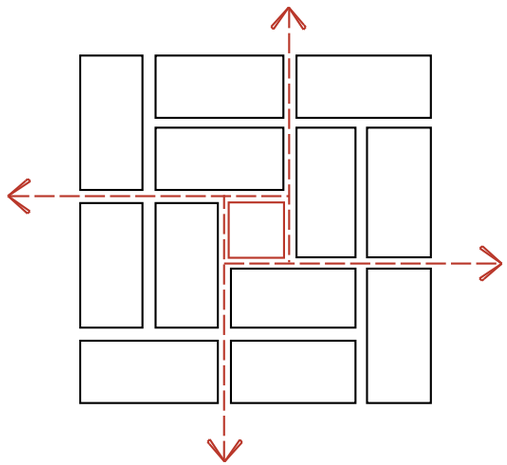


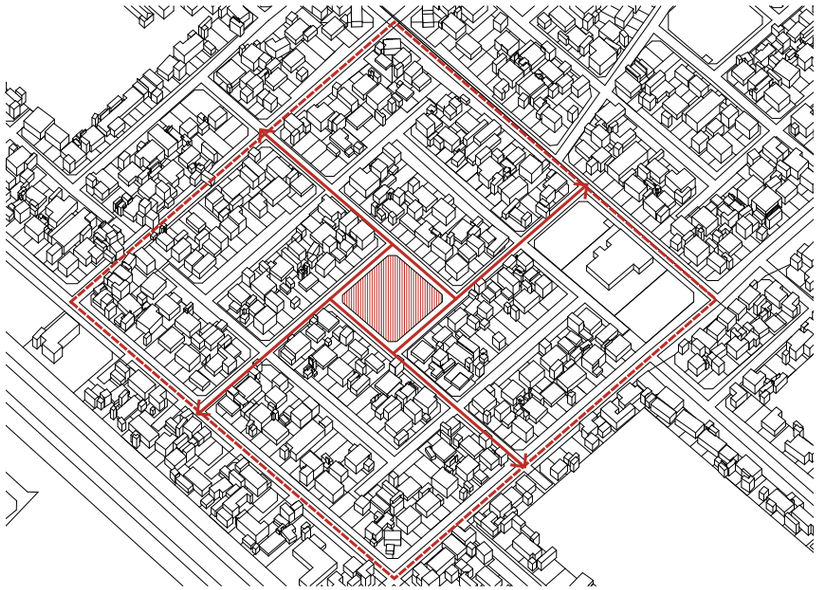
Figure 8: Davis, S (2023). Diagrammatic representation of pinwheel-concept (Left)

Figure 9: Davis, S (2023). Diagrammatic representation of collective public spaces (Right)

Public Space Typologies

Collective Open Spaces

The design was underscored by the creation of 'collective spaces' to foster public interaction, decked with trees, the design featured local amenities like playgrounds reinforcing the bond between home and street (Uytenbogaardt, 1978). The proposed central public areas, circled by double-storey terrace houses were designed to form a sort of 'wall' and form a safe interior residential area. In reality these public spaces were designed to encourage public interaction but without sufficient provision for maintenance or programming, theses spaces have remained underutilised and inadvertently lead to anti-social behaviour and crime.



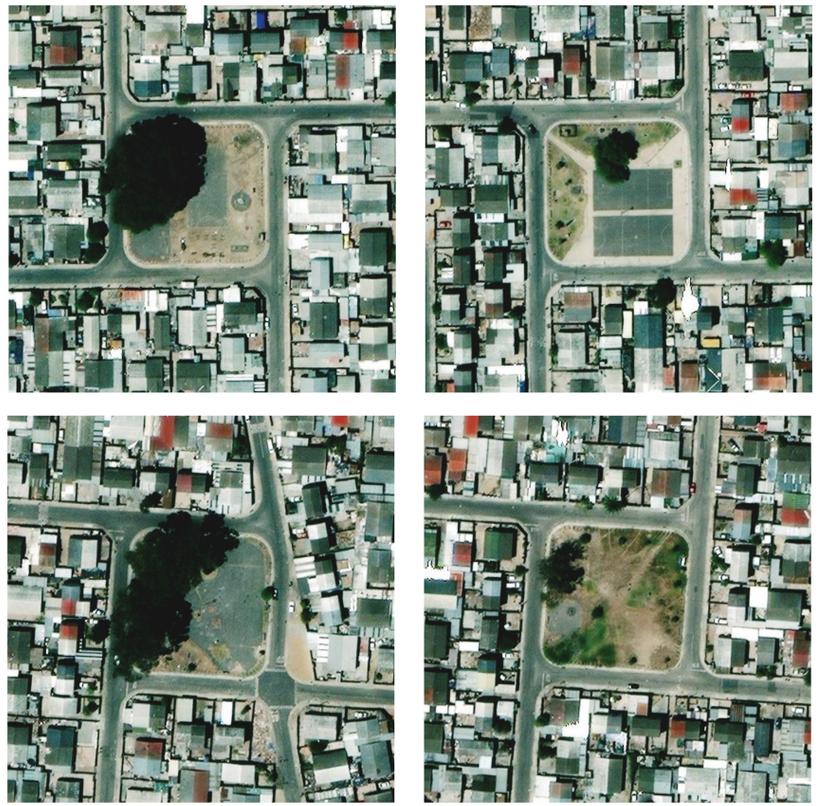
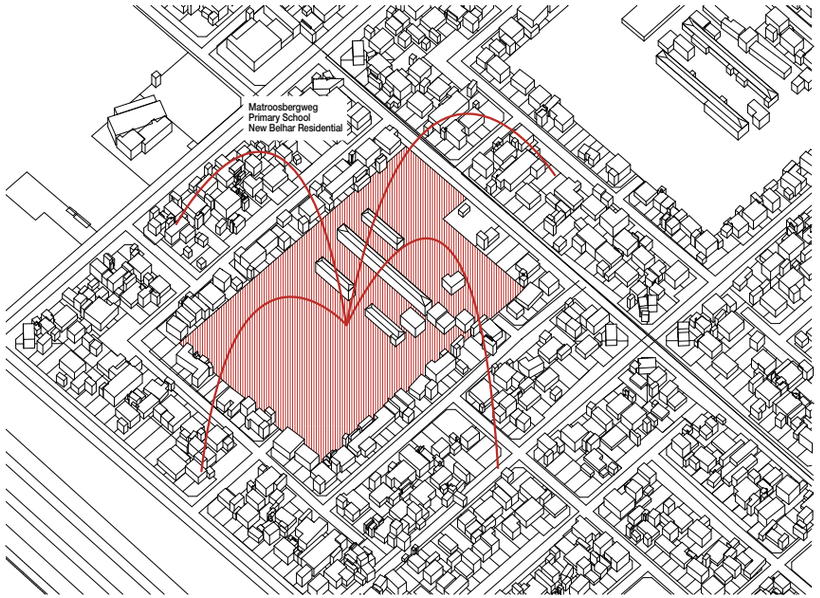


Figure 10: Davis, S (2023). Diagrammatic representation of central public spaces (middle left)
Figure 11: Davis, S (2023). Diagrammatic representation of collective school sites (middle right)
Figure 12: Davis, S (2023). Photographs of public spaces (Bottom)

Public Space Typologies

Collective School Sites

Similarly, when a school resided at the centre of the residential cell, the design philosophy remained consistent. Schools were situated such that they were surrounded by homes on all sides, cultivating a sense of community (Uytenbogaardt, 1978). Entry points were strategically situated at the beginnings of the pinwheel-roads to uphold the integrity of the urban fabric and deter disruptions that could morph into uninviting or unsafe pockets within residential areas. However, the passage of time has shown that even well-conceived plans often deviate from their intended outcomes. Uytenbogaardt's design, ambitious in its aim to create a 'complex' network of movement and opportunities, was unfortunately seen more as 'complicated'.



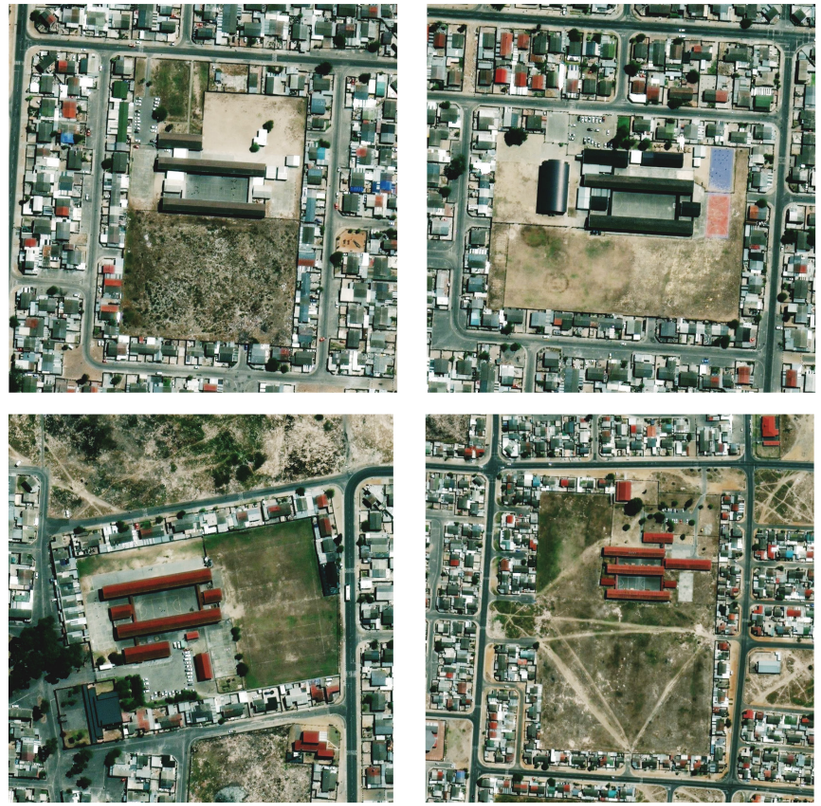
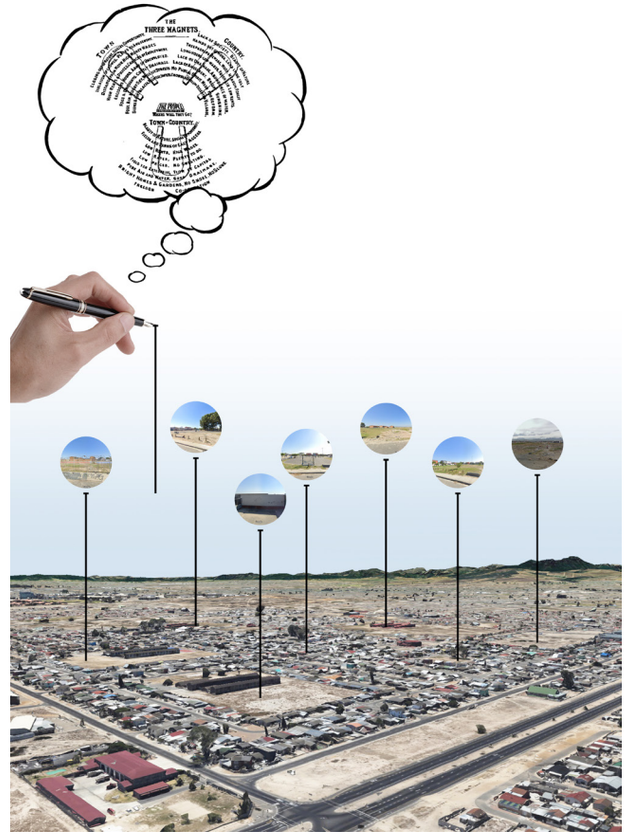


Figure 10: Davis, S (2023). Diagrammatic representation of central public spaces (middle left)
Figure 11: Davis, S (2023). Diagrammatic representation of collective school sites (middle right)
Figure 12: Davis, S (2023). Photographs of public spaces (Bottom)

Rejection of Uytenboghaardt's Belhar Masterplan

The proposed Belhar Masterplan garnered significant attention, primarily due to its break from established norms within the apartheid city (Murray, 2011). The unconventional pinwheel design new group housing type and significant public space inclusion challenged apartheid norms and was seen as a form of resistance aimed at creating liveable spaces. Despite its contentious nature, authorities initially approved the masterplan. However, complications emerged due to financial constraints due to increased housing demands as well as due to the experimental nature of the design. It is evident here that the private realm was privileged at the expense of the public realm. Edgar Pieterse astutely notes that the South African urban landscape was primarily moulded around individual houses and their associated amenities, with a general disregard or lack of attention to urban spaces, such as streets, parks and pavements (Pieterse & Simone, 2013), therefore it is no surprise that ultimately, in 1979, the Divisional Council of the Cape cancelled the plan, leading to Uytenbogaardt and his firm stepping away from the project. Despite the initial design's rejection, its street pattern and land use were reused, but with significant modifications to housing types, densities and program. These resultant short comings lead to often underutilised and poorly maintained spaces. Despite this, these spaces retain potential for more intense use given their size and location.

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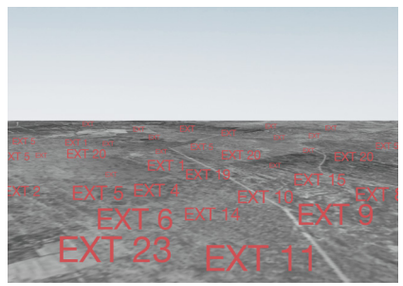

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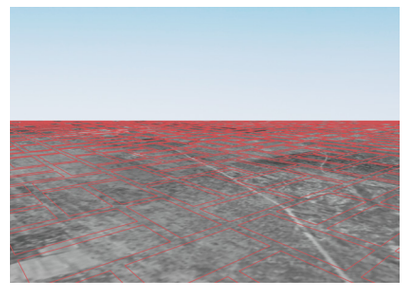
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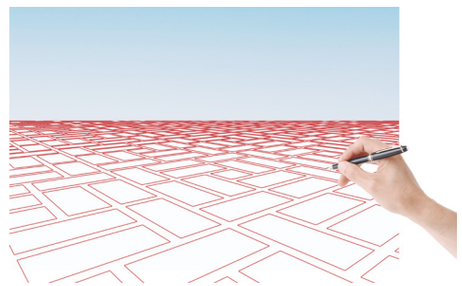
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Figure 13: Davis, S (2023). Symbolic Representations of Belhar Masterplanning ideas

Contemporary Analysis & Spatial Observations

Belhar's spatial design showcases the legacy of apartheid planning. Large buffer zones, isolating different racial groups, and arterial roads which encase the neighbourhood. External elements like the Sarepta railway line and industrial precincts sever Belhar from its surroundings including CPUT and UWC, while incomplete road circulation emphasises its introverted character. Take for example the current scenario where Erica Drive doesn't continue Eastwards towards Kuilsriver. This shortcoming forces students from Kuilsriver, attending either CPUT or UWC to deviate significantly from their intended path in order to reach their campuses. Also, the nonexistence of a northward connection from Belhar drive impedes vehicular traffic to Pentech Metrorail station, effectively isolating Belhar from the Sacks Circle precinct and Belville South Industrial.

The internal structure of Belhar too reveals isolation and separation. Higher order roads fragment the neighbourhood into smaller cells rather than integrating them. A redundant cement railway line, undesirable vacant land, and convoluted street patterns further contribute to the internal boundaries, complicating navigation within the area. The design of Belhar's internal road network, based on the Neighbourhood Unit concept, contributes significantly to the creation of isolated residential units within the area. The road hierarchy fosters inwardly-focused residential plots, particularly along major routes like Erica Drive and Symphony Way. The limited number of entry and exit points further underscores the areas insular nature, preventing through traffic and resulting in dead ends.

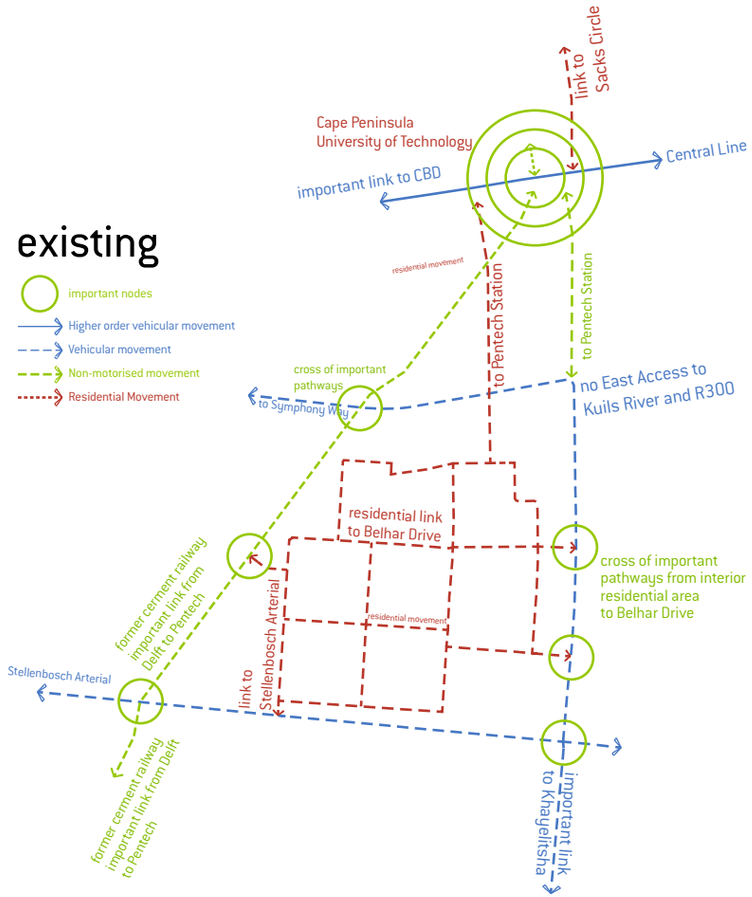


Figure 14: Davis, S (2023). Contemporary analysis of Belhar Satellite image
Figure 15: Davis, S (2023). Contemporary analysis of Belhar

Key Linear Movement Route

Addressing safety concerns linked to pedestrian routes is a critical consideration in the development of Belhar, given that crime incidents are frequently associated with these unsafe pathways. When mapping out potential locations for new upgrading initiatives, it is not only the nodal structures, such as the collective open spaces and school sites that need attention. A significant focus is also on identifying key linear pedestrian routes.

Two prominent structures are Belhar Drive and the former cement railway line. These major arteries extend from delft, cutting through Belhar and leading towards Pentech Metrorail station. These large-scale spines serve as crucial conduits for pedestrian traffic and as such, present an ideal opportunity for strategic improvements.

The ultimate goal of the dissertation is to propose ways to transform the spine into a secure and efficient pedestrian corridor. In tandem with nodal anchor points, the establishment of safe walking lines would result in a safer internal movement network. Furthermore, an intriguing opportunity presents itself at the junction where these heavily traversed pedestrian pathways meet – the Pentech station. Given its strategic position and high footfall, it could serve as an additional socially monitored anchor point within the internal movement network.

Specific proposals for this movement spines will be explored separately, however its potential role in enhancing safety and usability of Belhar's pedestrian infrastructure cannot be understated.

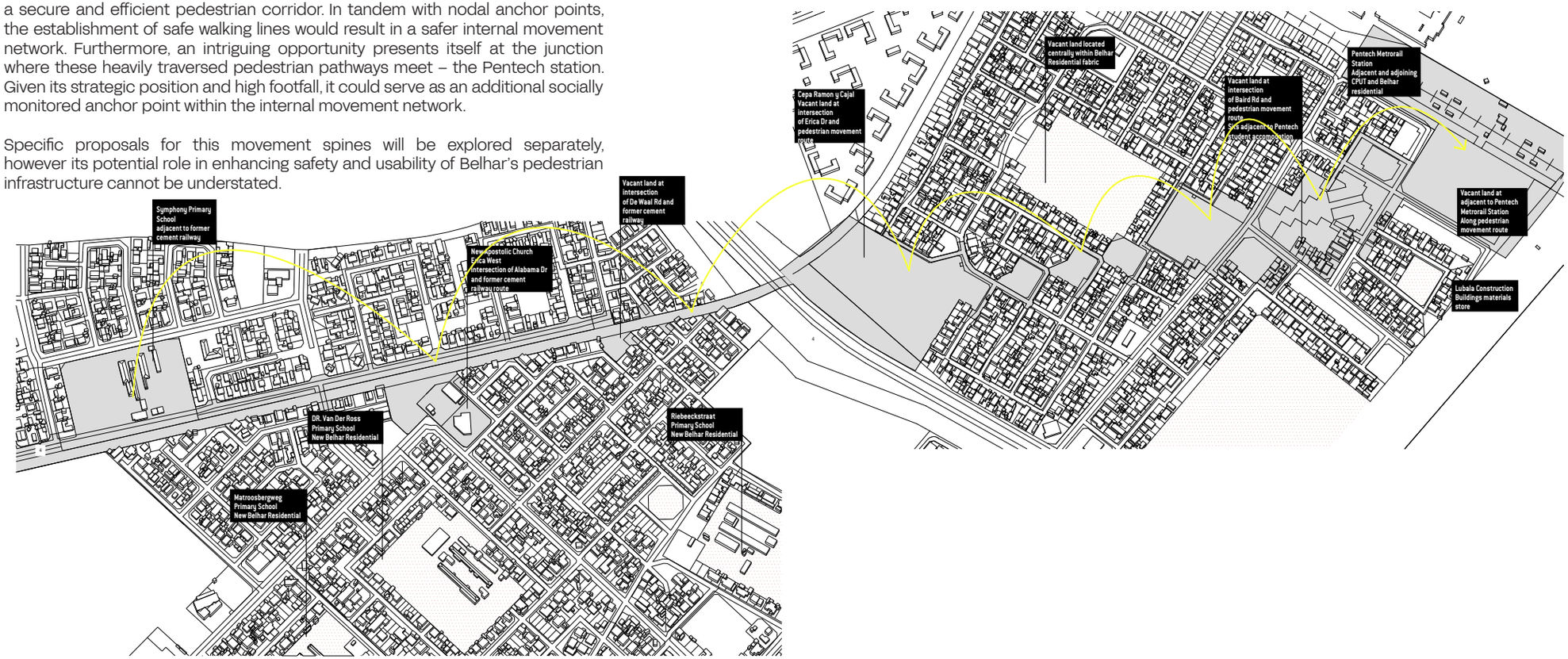


Figure 17: Davis, S (2023). Highlighting nodes along cement railway

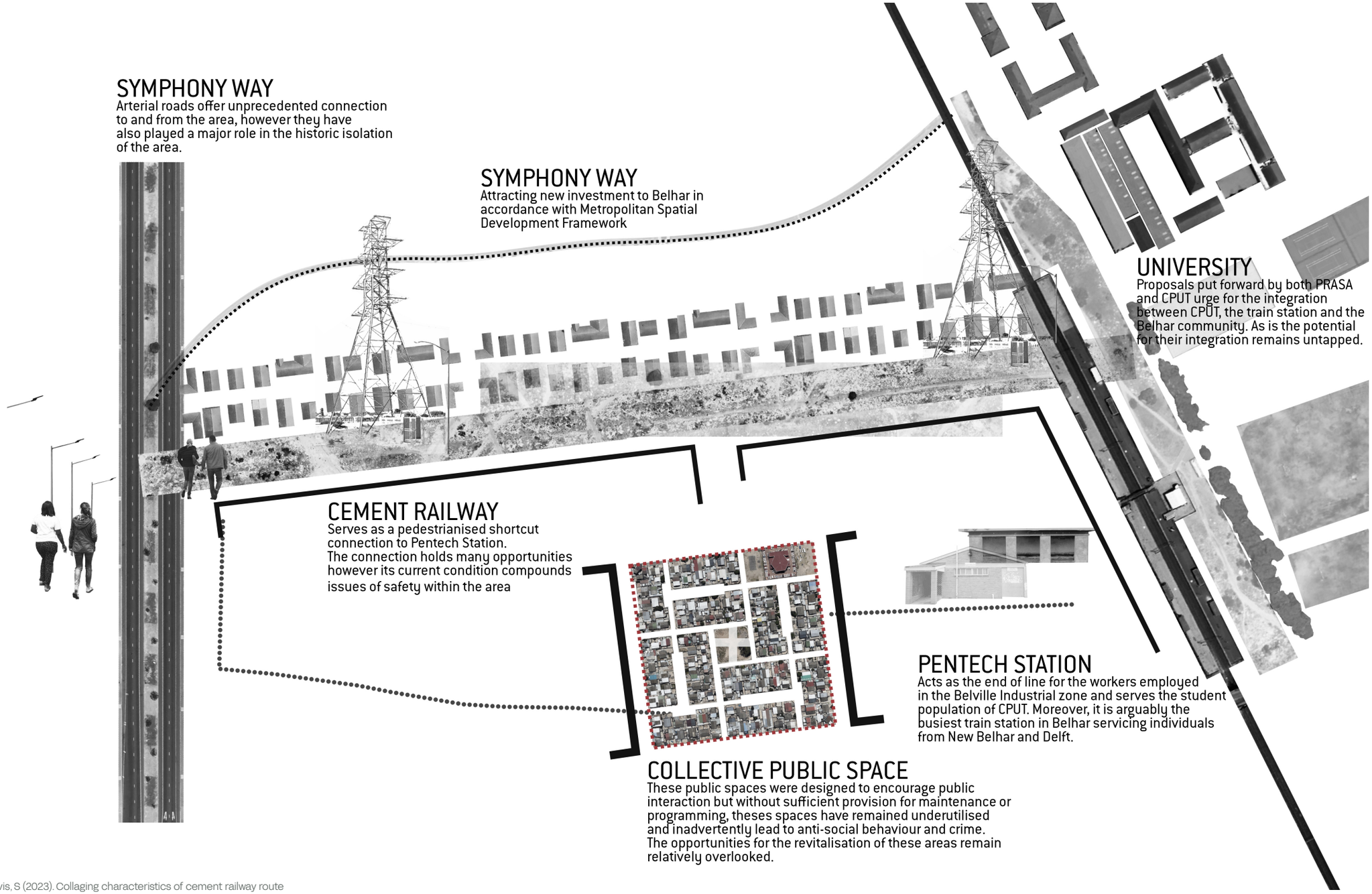


Figure 20: Davis, S (2023). Collaging characteristics of cement railway route

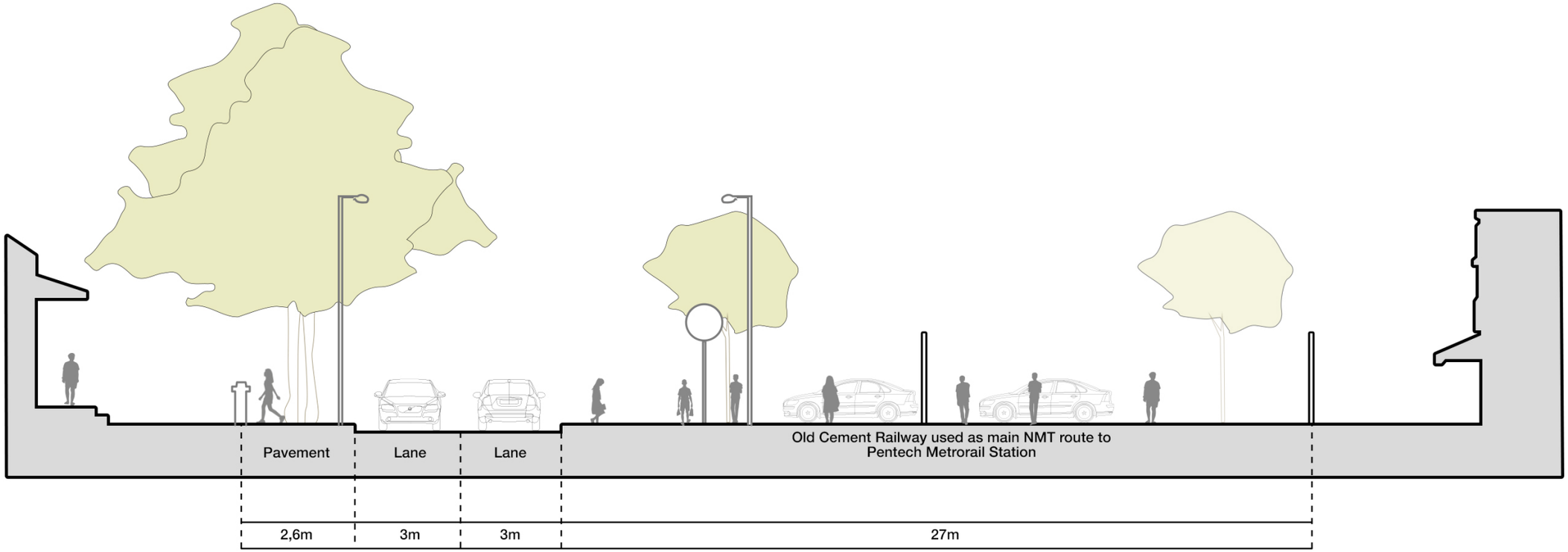


Figure 21: Davis, S (2023). Sectional drawing along cement railway movement route

Old Cement Railway Line: A Path of Opportunity & Challenge

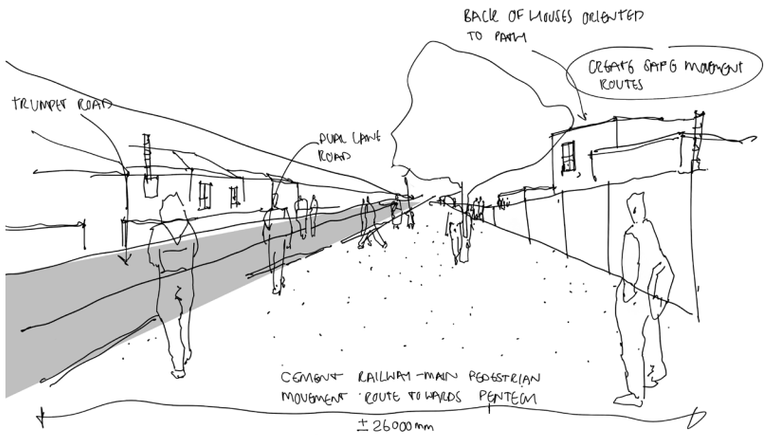
The cement railway line that once served the cement industry in Phillipi now cuts through the residential area of Belhar. This track has evolved into a dividing line, separating the middle-class residents of old Belhar from the less affluent people in New Belhar.

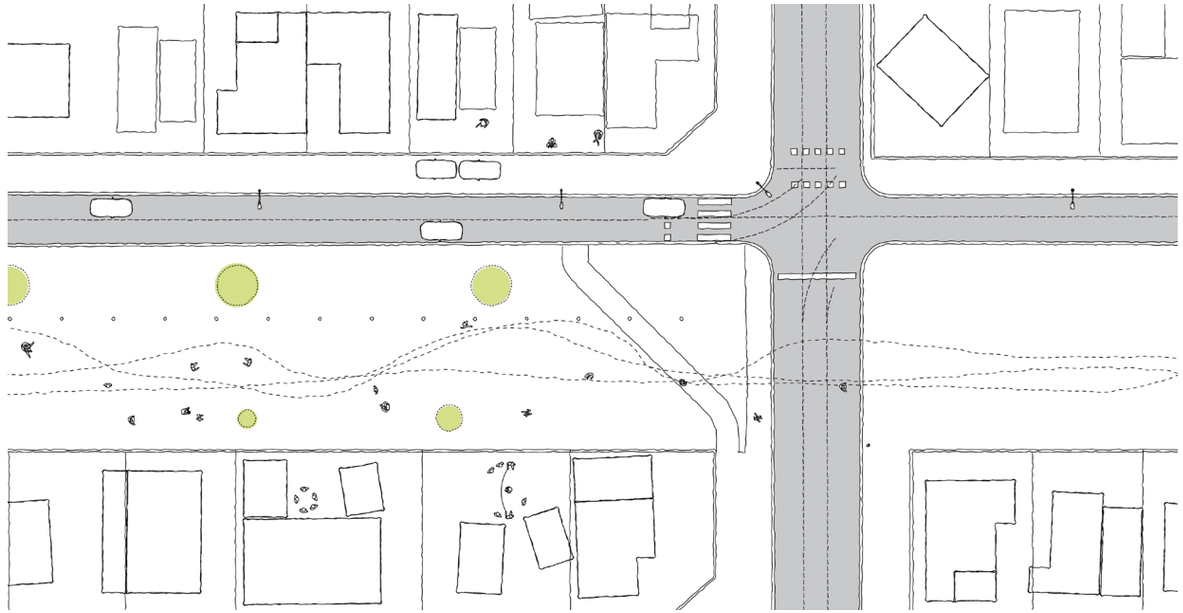
Though no longer serving its original purpose, the cement railways line offers a promising extension towards the Pentech station. This linear space could potentially be transformed into a direct, controlled walkway, connecting the residents of Belhar and Delft to the Pentech train station.

Despite its current utilisation as a quick path to Pentech station, the railway line's infrastructure lacks essential pedestrian facilities in ensuring a safe and comfortable walking environment such as sufficient lighting or street furniture. Furthermore, its neglected condition detracts from its appeal as a formal pathway, as safety within this space is not guaranteed.

Compounding the challenges is the absence of social oversight in the area. Many houses along the route have their back to the old cement line, with their rear walls forming an uninviting barrier.

With thoughtful planning and development, the cement railway line could emerge as a vital connection, bridging communities and improving accessibility, turning what was once a division into a unifying thread in the urban landscape of Belhar.





+ Cement Railway as main movement route through built fabric

Figure 22: Davis, S (2023). Sketch of characteristics of cement railway movement route
Figure 23: Davis, S (2023). Site plan of movement along cement railway movement route

Documenting the Journey along the Old Cement Railway

Figure 23.2 Documenting the journey along the cement railway movement route (Source: Google Earth)

Documenting the Journey along the Old Cement Railway at Key Nodal Points

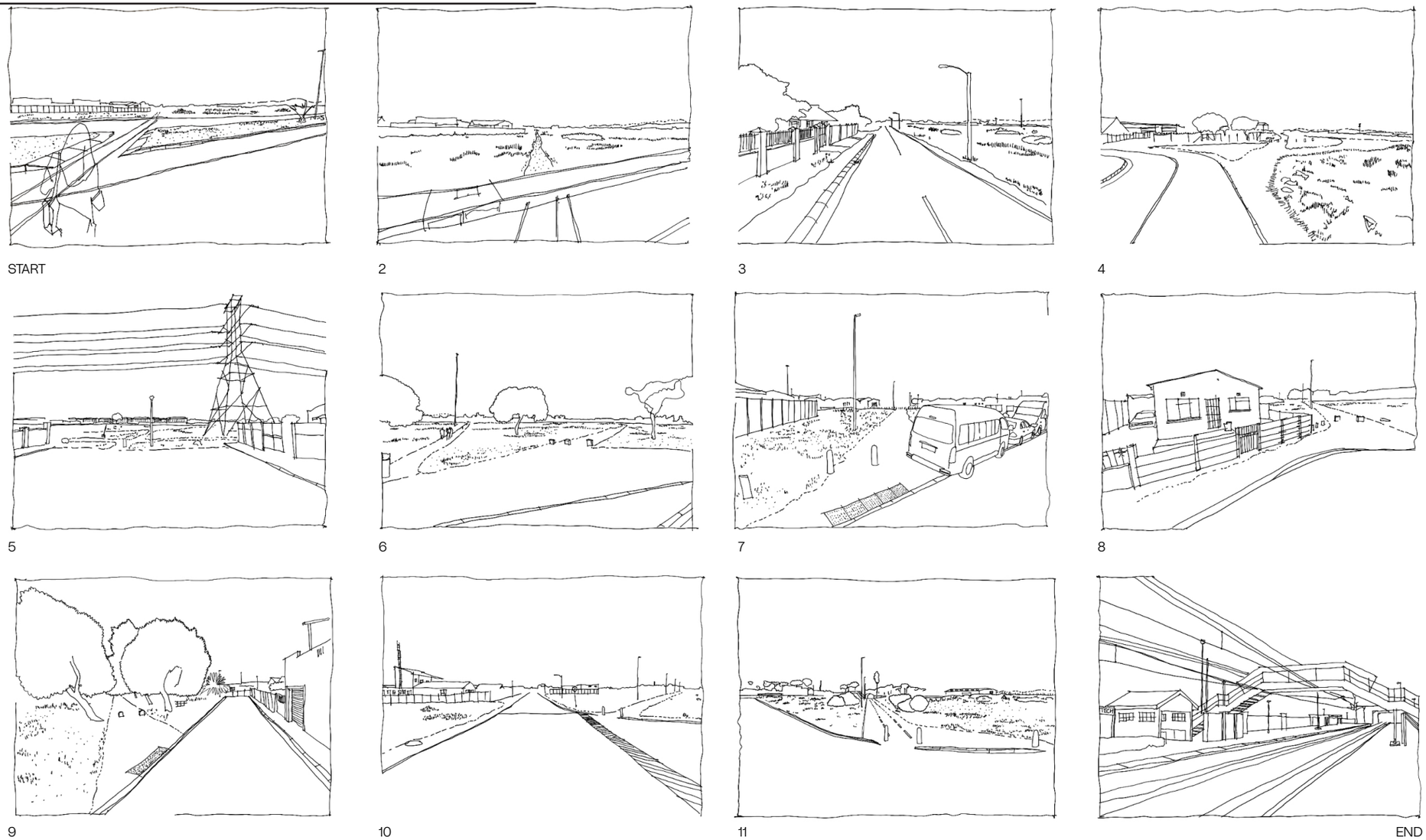


Figure 24: Davis, S (2023). Documenting the journey along the cement railway movement route

Social Hardships in Belhar

As discussed in the previous section Belhar's design was profoundly influenced by the Neighbourhood Unit concept (Schmit & Van Steenbrugge, 2012). This concept represented an idealised version of suburban life which starkly contrasted with the reality of the situation of Belhar residents under apartheid rule. The concept consequentially failed to materialise and the neighbourhood, often perceived as isolated, coupled with the unstable socio-economic status of residents in New Belhar, has transformed into a hotspot for crimes and social difficulties, undermining the potential of the area.

The aftermath of apartheid planning left many residents in Belhar, especially those in New Belhar, wrestling with limited education, poor socio-economic circumstances and a high rate of unemployment, as a result, these individuals, frequently living in substandard conditions, turn to drugs and alcohol as a means of escape (Murray, 2011). This unhealthy habit in turn triggers a slew of other societal issues related to crime, theft and violence.

The rising crimes rates in Belhar are further amplified by its planning structure. Structures designed to face inwards, homes with backyard orientations and the isolated urban setting have contributed to a void in social oversight. Additionally, the presence of vast, unmaintained expanses of land, such as the cement railway and open land scattered around Belhar, have become ground for criminality due to low surveillance.

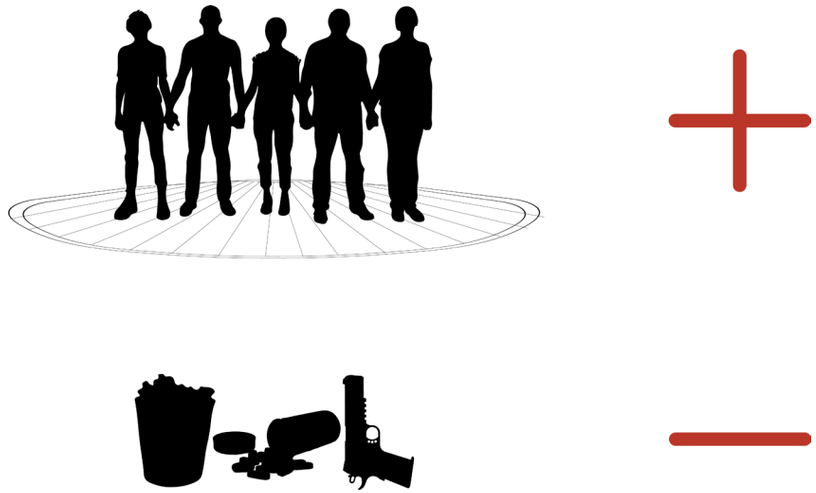


Figure 25: Davis, S (2023). Diagrammatic representation of social probelms in Belhar

Figure 26: Davis, S (2023). Collage representing social probelms in Belhar

Section 3 I Project Justification

Need for Public Transport

The low-income demographic and resultant low car ownership in the Cape Flats necessitated the crucial role of public transportation since its development. The rail system, founded during the apartheid era, still serves as a primary transportation method for a significant number of its inhabitants including those from Belhar. However, persistent problems, such as theft, assault and infrastructural inadequacies causing technical difficulties and delays plague the current transport system.

Despite the numerous benefits of train, including an expansive reach and cost-effectiveness, minibus taxis often present a much more reliable form of transportation. However, these taxis have their own unique set of hurdles, which include the lack of direct pathways to the Cape Town city centre, uncertainty relating to the ability to find a taxi and the path that they take as well as general instances of unsafe driving and hostility.

The majority of Belhar residents, given the low rates of car ownership, rely heavily on non-motorised means of transport and frequently walk to and from train stations. However, the dearth of well-kept sidewalks and safe pavements often compels pedestrians to navigate through vacant land plots, leading to increased safety concerns.

The cumulative effect of these challenges leads to a cyclical pattern of impoverishment in the periphery. The inequitable access to mobility resources deepens the socio-economic gap between the rich and the poor, further perpetuating the challenges faces by residents in these areas.

Figure 27: Davis, S (2023). Sketch of Belhar residence reliance on Public Transport
Figure 28: Davis, S (2023). Sketch of Belhar residence reliance on Public Transport

Need for Public Space

The poor condition of public areas within Belhar has resulted in a drastic reduction of public engagement. These areas are critically important for enhancing a sense of community as they offer valuable arenas for social integration and discourse. Ideally these areas are places where community members feel a sense of ownership and responsibility where they are allowed to best shape it to meet the personal needs of the community and develop a sense of responsibility over its maintenance.

Taking lessons from Uytenbogaardt's masterplan, it becomes evident why we need to revisit the concept of public spaces in Belhar. Despite his well-intentioned plan, the realities of implementation and usage resulted in spaces that were underutilised and often associated with antisocial behaviour and crime. This underscores the importance of not just creating public spaces, but ensuring they are designed, maintained and managed in ways that truly foster social cohesion and engagement.

Drawing on Justin McGuirk's 'Radical Cities', we come to understand social urbanism as a two-pronged phenomenon that integrates architecture and public spaces to serve social ends (Mcguirk, 2014). Reflecting on this, it becomes pertinent to identify the specific social goals of Belhar. These community-driven objectives form the foundation upon which spaces in Belhar can be re-envisioned. The immediate collective aspiration would be to establish an area that encourages community engagement, while also serving as a safe environment for all residents.

Drawing from this, the thesis will develop strategies to create such public spaces in Belhar, which serve as social hubs, informed by the unique social goals of Belhar, leveraging community engagement and shared ownership to create spaces that truly serve the residents of Belhar.

Metropolitan Spatial Development Framework

Placing Belhar in the Centre of a Network of Opportunities

Belhar, despite its challenges, presents significant opportunities for development due to its strategic location within the Cape Metropolitan Area. Its proximity to landmarks such as the Cape Town International Airport, Cape Peninsula University of Technology, University of the Western Cape and Voortrekker Road, as well as upcoming local projects position it as a potential economic and transit hub.

Historically policies have resulted in land use separation and the concentration of activities towards the city centre, contributing to physical and social immobility, especially for those in the peripheral apartheid-era New Towns. However, Belhar's central location within the Cape Flats provides it with an advantage over areas like Mitchells Plain or Khayelitsha, which are heavily reliant on the N2 to access the city centre. In contrast, Belhar has connections to both the N1 and N2 highways and offers direct train routes to both Cape Town and Bellville CBD.

To address these issues and promote regional development, the Metropolitan Spatial Development framework (MSDF) includes a proposed North-South link running through Symphony Way which connects Belville, Belhar, Mitchells Plain and Khayelitsha (City of Cape Town, 2011). This corridor will primarily function as a conduit for movement, focusing on Transit Oriented Development (TOD), however it also aims to ignite and guide commercial, residential and economic development where possible, laying the foundation for a network of harmonious neighbourhoods to fuel Belhar's development (Schmit & Van Steenbrugge, 2012).

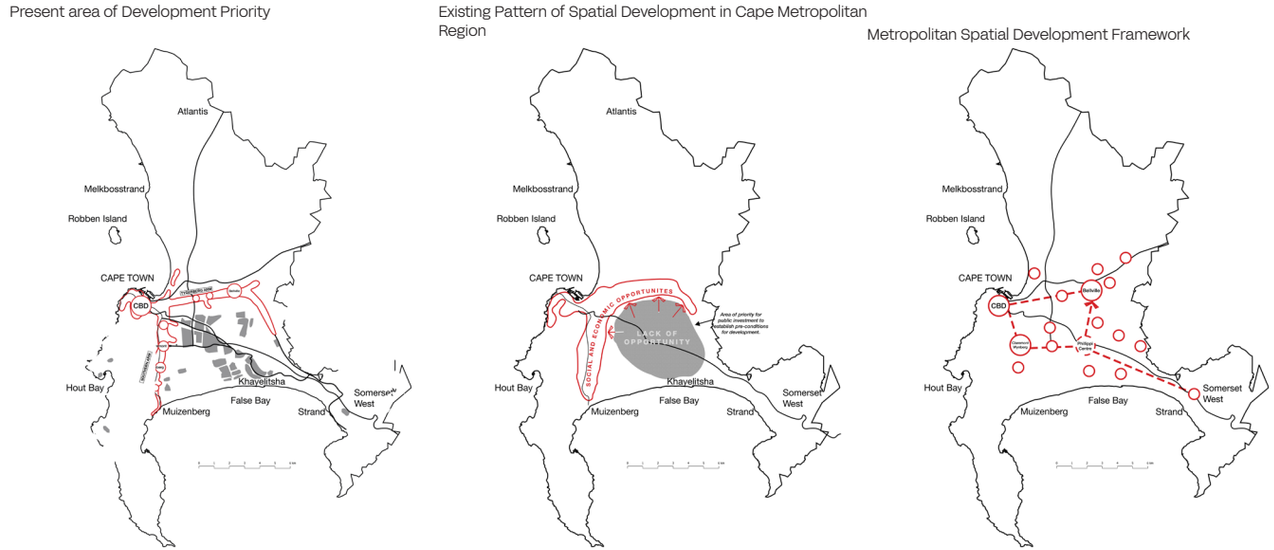


Figure 30-33: Davis, S (2023). Representational drawing of the MSDF's areas of focus in relation to problem area

Pentech Station

Located at the Eastern edge of Belhar, the Pentech Station serves a dual purpose. It acts as the end of line for the workers employed in the Belville Industrial zone and serves the student population of CPUT. Moreover, it is arguably the busiest train station in Belhar servicing individuals from New Belhar and Delft. Despite its frequent use, its isolated position has resulted in a lack of any commercial expansion within the stations proximity.

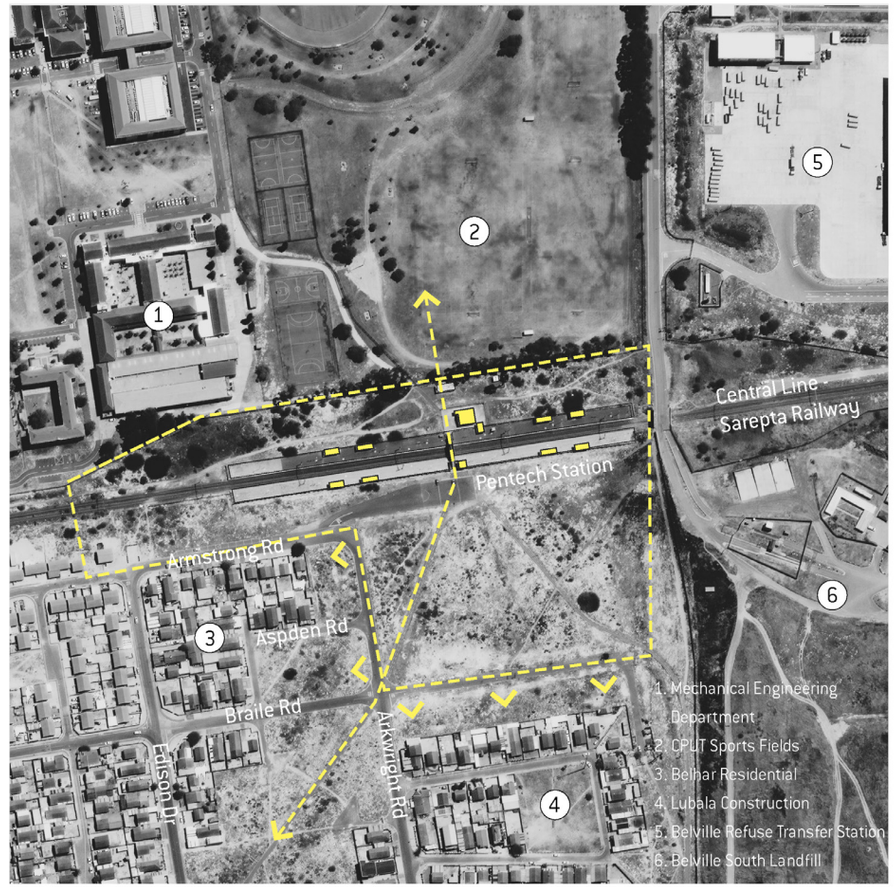


Figure 34-35: Davis, S (2023). Siting Pentech Metrorail Station in Belhar's context

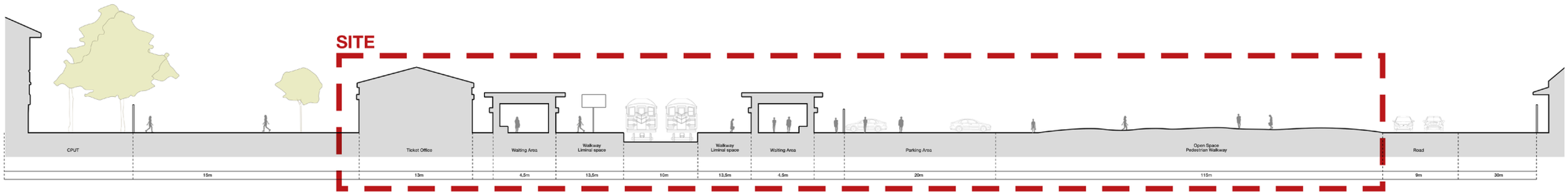


Figure 36: Davis, S (2023). Section cut along Pentech Metrorail Station site

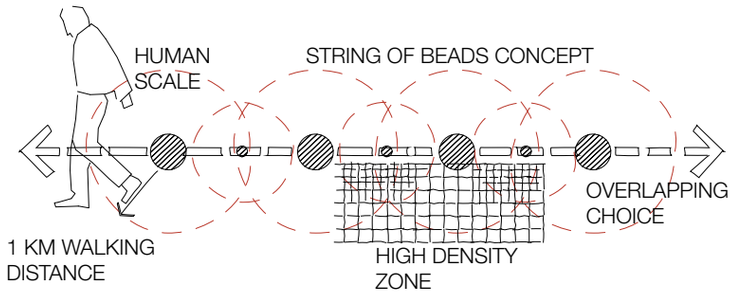
Section 4 I Theoretical Investigation

A People Centred Approach to Transport in Belhar

The urban characteristics of Belhar are a complex matrix of spatial, social, economic, political and environmental elements. Crafting a blueprint for sustainable urban mobility in Belhar demands a comprehensive perspective that appreciates these intricate intersections. Many of the obstacles that Belhar faces are rooted in the existing socio-political and economic frameworks and practices.

In this context, it's crucial to perceive travel as a 'derived demand', originating from individuals' inherent need for social and economic engagement. The primary purpose of most travel within Belhar isn't mere movement, but to foster connections, sustain livelihoods, pursue education or procure necessities (UNHabitat, 2013). Modes of transportation like taxis and bicycles are merely instruments in achieving these aims.

With this insight, we shift the narrative from 'motion' to focus on 'people' and 'places'. This perspective enables us to view Belhar and its mobility infrastructures as catalysts for the desired social changes, with transportation serving a facilitating role.



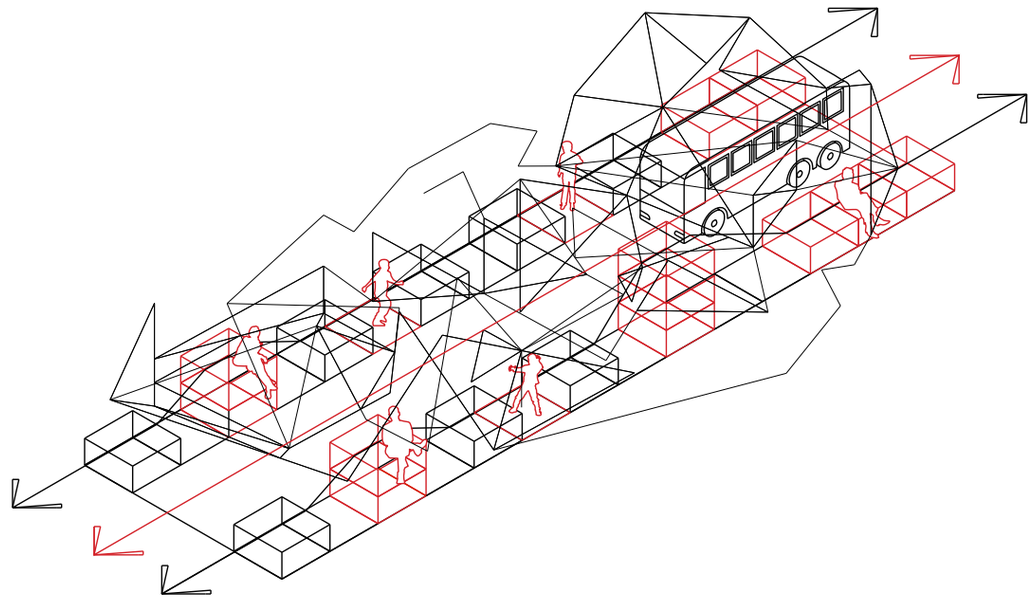


Figure 37: Davis, S (2023). Diagram representing people centred design aims
Figure 38: Davis, S (2023). Diagram representing people centred approach to design

Urban Mobility as a Catalyst for Change

In the pulse of today's world, mobility doesn't merely underpin our societal structure; it is the rhythm and heartbeat that drives it. The urban ebb and flow and movement of people and goods sets the stage, choreographing the development, design and expansion of our cities. The march of globalisation manifests as a rapid proliferation of transport and tech-driven communication links reaching every corner of our interconnected world. This age of 'hyper-mobility', as described in the UN Habitat report (2013), necessitates travelling greater distances with increased speed to keep up with the growing demands for our expanding cities, societies and economies. This frantic tempo insists on more extensive transport infrastructures such as roads and railways, intended to bridge gaps and connect disparate urban and rural areas.

Yet, the daunting task of keeping up with the escalating demands of social and economic mobility in rapidly growing cities is a challenging feat without sustainable public transport infrastructures in place. It requires not only the construction of new hard infrastructure but also the weaving of a network that respects and reflects the human experience. As architectural theorist Bart Lootsma notes, due to globalisation, modern cities have increasingly become concerned with how cities and towns function within a larger interlaced network, with a dwindling focus and understanding of community. This enhanced institutional autonomy consequently brings with it an increased feeling of isolation compared to the close-knit communities of the past (Lootsma, 2009).

Despite the growing momentum in urban mobility systems and strong advocacy for integrated transport models, several roadblocks remain on the journey towards equality, freedom of movement and sustainable efficiency in public transport infrastructures. One key hurdle is the lack of profound understanding of the interplay between public transport systems and the commuters who navigate it. Emphasising the role of social interaction, James Chakwizira, a researcher at CSIR's Built Environment Department, theorises that the cycle of social exclusion may persist if mobility and access are limited. Traditionally, transport planning has focused on expanding infrastructure as the solution to urban mobility issues, however this approach has often led to environmental damage, social segregation and unsustainable outcomes. This forms a substantial obstacle to sustainable mobility and community growth in both urban and rural environments (Chakwizira, 2009).

Emerging from this complex scenario is the realisation that the discourse around urban mobility has evolved beyond the mechanical and physical aspects of transport infrastructure. Today's mobility theories pivot around personal practices and user logistics (Da'vila, 2013). These are not just mere additions to the discourse, but integral elements of the transport infrastructure puzzle. User logistics is based on the understanding of why and how people use transport and entails various aspects such as social dynamics, including accessibility, affordability, socio-spatial segregation and user safety.

Documenting Public Space Typologies along Mobility Routes in Belhar

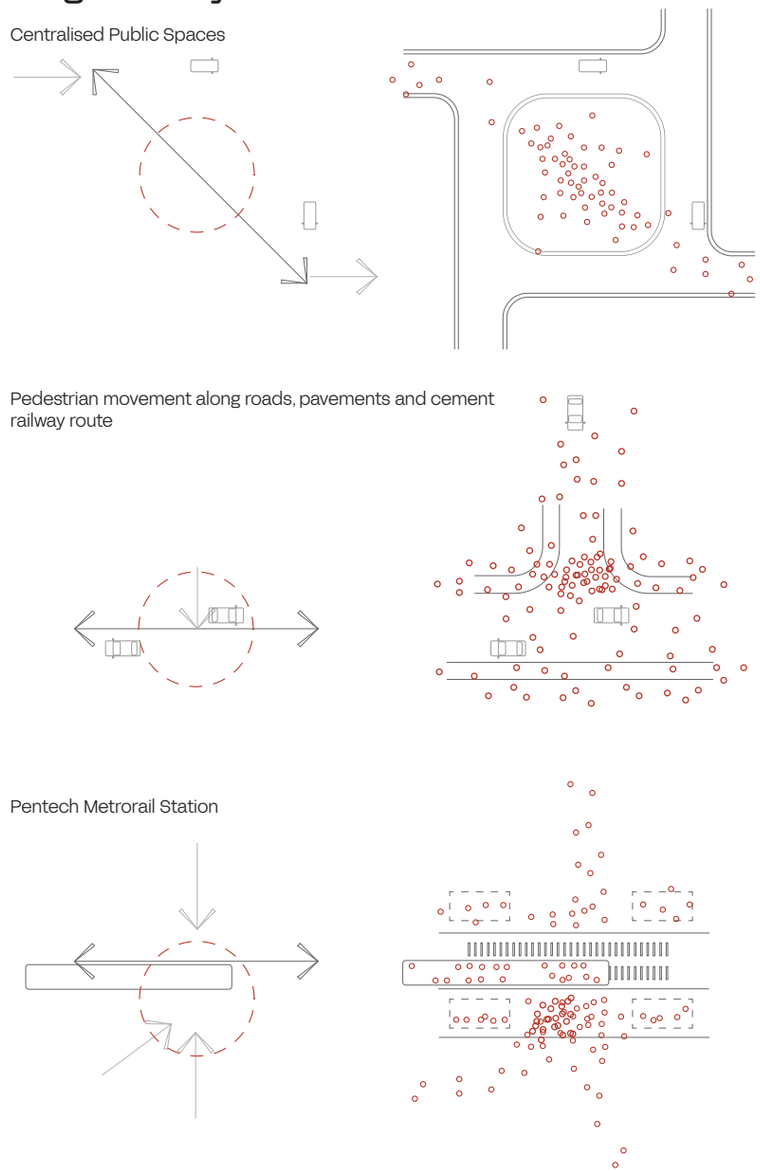


Figure 39: Davis, S (2023). Diagram representing urban mobility as catalysts for change

Reconnecting Urban Mobility & Public Space

The profound connection between public space and urban mobility offers a key theoretical approach to understanding the sustainable evolution of modern cities. This perspective suggests that effectively coordinated and facilitated urban mobility can enhance the vibrancy and liveability of public spaces. Similarly, well-curated and frequently populated public spaces can foster more sustainable modes of urban mobility.

This viewpoint emphasis the fact that public spaces, when leveraged for eco-friendly transportation methods, such as public transit, walking or cycling, can significantly enhance a city's economic, environmental and social sustainability. Moreover, this idea enriches the ongoing discourse of the importance of amplifying investments in public spaces. In this context, public spaces play a pivotal role in nurturing inclusive communities, cultural diversity and a thriving public culture.

Public spaces fulfil dual purposes, acting as hubs of activity and conduits for mobility, orchestrating people's movement within a city. This duality impacts how individuals navigate and experience the city, influencing overall urban sustainability (Gehl, 2011). Historically, streets, squares and plazas have been instrumental in connecting people, goods and locations, but the onset of care-centric planning led to a disconnect between public spaces and mobility, often trading their social functionality for aesthetic and practical purposes (Jacobs, 1961).

Echoing Jane Jacobs' critique in 'Death and Life of Great American Cities' the rise of these modernist ideas resulted in cities being compartmentalised into functional zones, promoting vehicular movement at the expense of pedestrian interaction and urban vibrancy (Jacobs, 1961). This led to a shift where streets were regarded merely as traffic conduits, and urban spaces were seen as idle or unused land, which undermined the communal value of public spaces.
To rebalance the relationship between public spaces – particularly railways, streets and urban mobility, it is necessary to reassess and re-evaluate both railways, streets and the network of public spaces in terms of their social and formal utility to facilitate efficient mobility (Zavetovski & Agyeman, 2015). This includes reintegrating spaces for diverse types of movement and various purposes. Specifically, it involves transforming streets to appeal to all users, with the intention to enhance their dual role as spaces for urban living and mobility. Furthermore, it is essential to adapt these spaces to suit evolving societal needs and functions.

Examples of this transformation includes the construction of bicycle paths, outdoor communal areas and the development of an efficient public transit system. These initiatives are testament to how enhancing mobility options aids in the creating and sustainable utilisation of public spaces. Such changes underscore the opportunity to reintegrate people's daily activities within the city structure, making the experience of traversing the city a rewarding and fulfilling one (Jacobs, 1961). It brings light to the crucial understanding that the quality of our surroundings impacts out experiences and perceptions of movement. Thus, nodes of transportation like walking, cycling or utilising public transit through these public spaces should be seen as opportunities to enjoy the environment, actively engage with society and interact with others experiencing the same.

In response, the early 21st century saw a shift towards re-establishing the link between streets, neighbourhoods and society. The built environment began to focus more on cultural openness, personal fulfilment and inclusivity. The goal in this new paradigm is to create cities where cars, bicycles and pedestrians can coexist harmoniously. Streets are being designed to reclaim their multi-functional character, encouraging integrated use of spaces and various modes of movement.
In conclusion, re-establishing the relationship between urban mobility and public spaces and restoring the social value of streets, is a key strategy for achieving urban sustainability. The integration of everyday activities, appealing streets along daily movement routes and understanding spaces quality's effect on mobility experience are all crucial. Consequently, promoting active movement through public spaces and public transport should be a positive, engaging experience that contributes to urban sustainability.

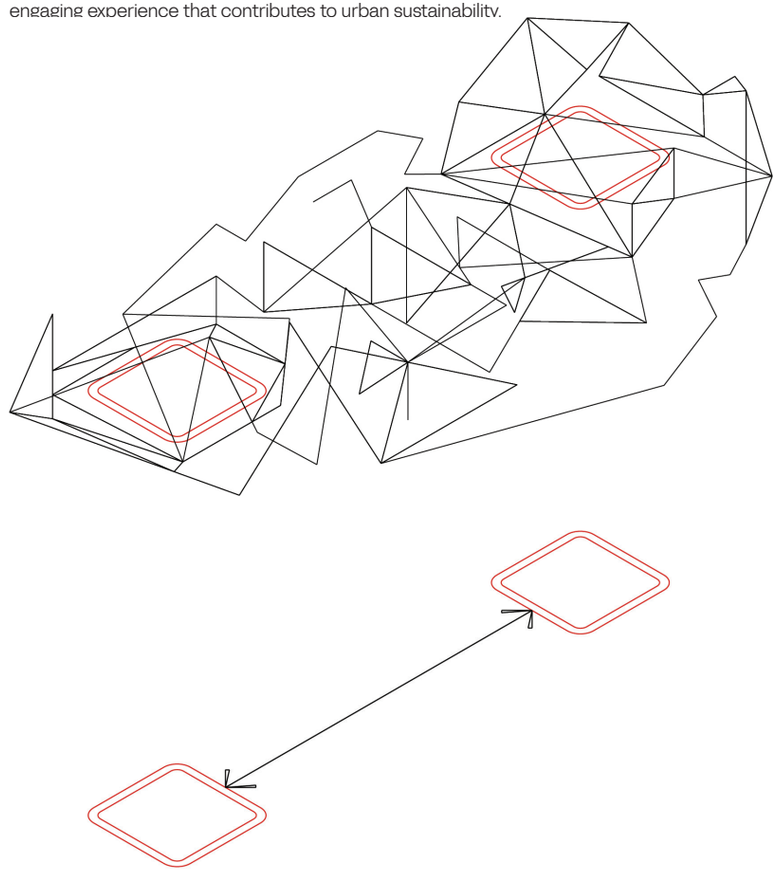


Figure 40: Davis, S (2023). Diagram representing urban mobility and public space network

Case Study - Adressing Urban Mobility Issues

VPUU

The Violence Prevention through Urban Upgrading (VPUU), an innovative urban regeneration programme based in Cape Town, South Africa, offers a compelling case study for the integral connection between urban mobility and public spaces. The programme demonstrates an intricate understanding that vibrant public spaces can play an instrumental role in reducing violence, crime and simultaneously enhancing the overall quality of life in disadvantaged areas (VPUU, 2016).

An exemplary implementation of the VPUU's work can be seen in the township of Khayelitsha. Here, the programme has been successful in transforming underutilised and unsafe areas into dynamic public spaces. The creation of pedestrian pathways, public plazas and recreational areas have not only improved safety but also stimulated local economic activity and enhanced social interaction, thereby striking a delicate balance between crucial urban elements (Holmes, 2014).

Crucial to the success of VPUU's model is the principle of community participation and engagement. The VPUU integrates local residents into the planning and implementation process, thereby creating spaces that respond to the community's needs and desires (VPUU, 2016). This not only allows the residents a voice in the transformation of their neighbourhoods but also leverages their unique local knowledge to enhance the design and functionality of these spaces.

Community engagement also stimulates a sense of ownership and pride within the local populace, fostering a sense of community identity and solidarity. These tangible outcomes, along with improved safety, increased access to facilities and enhanced social interaction, contribute to an overall enhanced quality of life in these areas.

At the heart of VPUU's comprehensive approach is the concept of 'Safe Nodes', a spatial planning model that fosters safe, accessible and vibrant public spaces within communities often overlooked in traditional city planning (VPUU, 2016). These public spaces are conceived as a well-connected network providing a range of amenities, from sports facilities and playgrounds to markets and community centres. This network encourages continuous dialogue and feedback with the community to address any emerging needs or concerns, ensuring that these regenerated spaces remain relevant, inclusive and sustainable over time.

However, a major challenge confronting public spaces within South Africa is the insufficient management and financial resources dedicated to their upkeep (Holmes, 2014). Often, once the spaces are designed and implemented, ongoing maintenance and operation are inadequately funded. Therefore, creating and sustaining vibrant public spaces also involve exploring alternative finding models that ensure these spaces remain economically viable in the long term. Various strategies, such as incorporating commercial components, fostering partnership with private entities or non-profit organisations and encouraging community-led initiatives are pursued towards this goal.

The ultimate goal of VPUU's model is to ensure that public spaces can maintain themselves economically with minimal dependence on municipal support. This approach underscores the criticality of the financial sustainability of public spaces for their longevity and continued relevance within the urban fabric of the city.

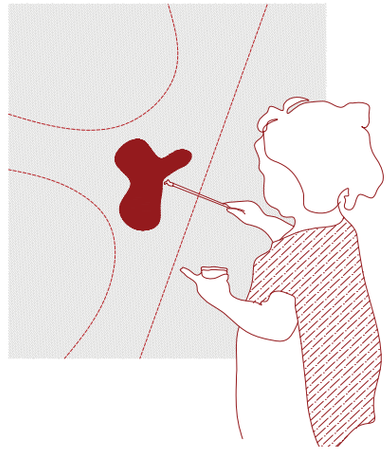


Figure 41: Davis, S (2023). Diagram representing community participation in VPUU projects
Figure 42-44: Images from VPUU Safe Node Area Active Boxes (n.d) [image]. Available at: http://vpuu.org.za/safe-node-area/active-boxes/ (Accessed: 3 August 2023)

Mobility as a Key to Accessibility

The concept of urban accessibility is a critical facet of transportation infrastructure that encompasses more than just the ability to move from point A to point B, acknowledging that the dynamics of a thriving city must go much further than that in order to cater to all members of the city. These range from affordability, safety, social status, proximity, disability, gender equality and opportunities for social engagement. This broader approach is encapsulated by the term 'social accessibility' (Da'vila, 2013).

Social accessibility serves as a gateway to opportunities. It embodies an individual's capacity to connect with job prospects, education, knowledge, technology and services and participate actively within their city. Social accessibility is about the intertwining of physical and social threads into the narrative of urban mobility, recognising that transport infrastructure is not merely about movement but includes the resulting interactions, experiences and access to essential services.

Notably, the design of the built environment plays a significant role in improving accessibility. Urban spaces that promote a mix of activities, are densely populated and maintain active public spaces not only reduce the need for expansive transport systems but they also foster greater accessibility, connectivity and facilitate non-motorised forms of mobility. Additionally, accessibility in urban transportation is deeply tied to public spaces and infrastructure design, such as train stations, bus stops and transit hubs. Such design considerations are particularly important for passengers with reduced mobility, underscoring the need to integrate their feedback and needs into efforts to boost accessibility.

In a similar vein, universal design – an approach advocating for spaces and systems that are inherently accessible to all – plays a crucial role. It's an evolving paradigm that, despite cultural variances globally, shares more similarities than differences. Seven principles guide universal design: Equitable use, flexibility in use, simplicity and intuitiveness, perceptible information, tolerance for error, low physical effort and adequate size and space (Mace, 1997). These principles inform design standards that cater to individuals with a diverse range of disabilities. Although universal design is more commonly acknowledged architects, its relevance in the realm of public transport and therefore public transport architecture should not be underestimated (Zając , 2016).

Moreover, technology, especially information and communication technologies (ICT) systems, have a pivotal role in bolstering accessibility in urban mobility (Da'vila, 2013). They contribute to the functioning of public transport infrastructures on a technical level, while also facilitating social communication and access to knowledge and opportunities. In this context it is clear that a sustainable model for designing transport infrastructure needs to include and promote technology as a tool for creating social accessibility and equality.

A common misconception is that universally designed projects primarily serve a minority and are thus economically unviable. It should be stressed that all passengers gain from universal design solutions. They ease physical efforts needed for activities like the boarding of vehicles and provide better visibility with contrasting railings inside vehicles (Zając , 2016). Additionally, most passengers fall into multiple user categories and may need additional adaptations in certain situations, making universally accessibly public transport a key facilitator of social integration for individuals with reduced mobility and an added benefit for others under specific circumstances.

The UN Habitat (2013) report highlights a critical shift from the conventional 'hard' infrastructure centric perspective towards a more sustainable urban mobility model. This model not only incorporates transportation but also seeks to integrate these various elements of social accessibility, making our cities more inclusive and resilient.
However, the success and sustainability of urban public transport infrastructures hinge not just on physical systems but also on unseen systems that play a crucial role. These include the social dimensions within mobility and accessibility in urban transport systems, considering how these aspects link together and are influenced by the structure design, and function of the urban environment. In essence, urban mobility is about striking a balance between the physical and social aspects to create vibrant, accessible, and sustainable urban environments.
Despite high mobility, New Belhar's full accessibility remains untapped. Presently, public road transport is the sole feasible option for traveling distances beyond a comfortable walking or cycling radius. The region presents considerable challenges, exhibiting disorderly characteristics, and lacks safe and approachable mobility options for the disadvantaged or disabled, barring vehicular transportation.

Role of Mobility in Developing Social Connections

A comprehensive understanding of urban mobility is essentially incomplete without a deep dive into its societal underpinnings-elements such as equal accessibility, individual autonomy and the right to unrestricted movement. Emphasising the role of social interaction, James Chakwizira theorises that the cycle of social exclusion may persist if mobility and access are limited (Chakwizira, 2009).

Indeed, societal dynamics become glaringly visible in socio-economic disparities that can serve as barriers to access for certain groups due to financial limitations, geographical isolation, or spatial exclusion. These dimensions demand consideration of other societal factors including gender and ethnic imbalances, safety issues and transport related anxiety. The strategies we devise for safety and planning of urban spaces for pedestrians and commuters are fundamentally linked to these social concerns. These societal aspects are intertwined with accessibility and urban mobility, influencing the efficiency, success or failure of transport systems and urban environments. Recognising these components is vital for individuals to contribute constructively in social networks.

The proposal is deeply rooted in the philosophy of French Marxist philosopher and sociologist, Henri Lefebre's theory of the 'right to the city'. In his 1968 work, "Le Droit a la Ville" ("the Right to the City"), Lefebvre argued for the democratisation of urban spaces, emphasising that the inhabitants should play an integral role in shaping the city's development and the benefits of urban life should be easily accessible to all (Lefebvre, 1968).

Drawing parallels to Lefebvre's ethos, the unfolding narrative in Belhar envisions not just an architectural revitalisation, but also a comprehensive socio-cultural reconditioning that foregrounds the 'right to the city' principle. Principle to this reconfiguration is the belief that the city's built environment should be an enabler rather than a barrier, contributing to the eradication of socio-economic disparities and facilitating civic participation and access to essential services.

AFFORDABILITY

David Harvey, a contemporary of Lefebvre, further built on the 'right to the city' framework, outlining the intricate relationships between capital, the built environment and social processes. His work, particularly his theory of the 'urban process', highlights the manner in which city structures can either facilitate or hinder social and economic equality (Harvey, 1985). In Harvey's view, cities should be built and transformed not merely as sites of capital accumulation, but as spaces for the 'collective power to reshape the processes of urbanisation' (Harvey, 2008).

Echoing Harvey's perspective, the envisioned transformation of Belhar positions the built environment as a key agent in dismantling socio-economic inequalities. Specifically, it foregrounds affordability in its design and operation of public transportation. The aim here is to provide a sustainable, accessible and economically viable transportation system that does not strain the resources of the economically challenged residents.

INCLUSIVITY

Elizabeth Grosz's 'architecture from the outside' theory (Grosz, 2001) serves as a guiding principle in ensuring inclusivity within the intervention. Grosz argues that there is a need to rethink architecture, not just as a static entity, but as a living space that has the capacity to interact with, and have a transformative effect on its inhabitants (Grosz, 2001). In this view the structures of the built environment are not merely passive vessels that house social interactions but are active agents that can shape identities, desires and social relations.

From this perspective, the ambition for Belhar's urban design is to transcend beyond mere creation of physical structures to facilitate movement. Instead, the objective is to craft spaces that acknowledge, respect and cater to the unique experiences and needs of men, women, the elderly, differently-abled individuals, and young students who commute long distances for education.

SAFETY

Extending Grosz's theory to its socio-spatial implications, Belhar's architectural transformations will also actively work to mitigate safety concerns (Grosz, 2001). For instance, well-lit public spaces and safe walkways will be designed to combat the security threats often faced in these areas. Similarly, comprehensive provisions for the elderly and disabled will be considered in the architecture, recognising the rights to safe and hassle-free mobility.

In summary, Belhar's transformation strategy intricately weaves socio-architectural theories into its very urban fabric emphasising an architectural design that reaches outwards and actively engages with its inhabitants. Such an approach aspires to fulfil the aspirations of Lefebvre's right to the City', creating an urban environment where the architectural landscape serves as a vehicle for social change, integration and equality.

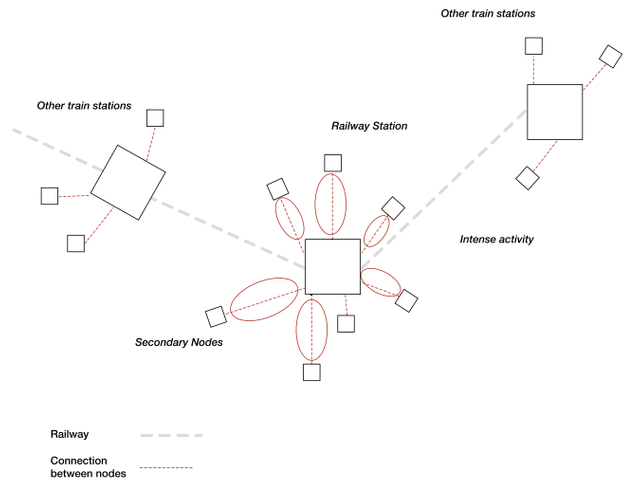


Figure 45: Davis, S (2023). Diagram representing role of mobility in developing connections

Spatial Dimension of Urban Mobility

The spatial dimension of urban mobility is central to the organisation of cities and profoundly influences how people interact with the urban environment. Belhar's urban fabric, characterised by sprawling peri-urban and suburban spaces, is a legacy of past policies, echoing Jane Jacobs' critique of city planning and urban sprawl (Jacobs, 1961). This sprawling built environment presents a challenge by dictating the mobility patters and necessitating lengthy commutes. Yet, within these challenged, lies the opportunity to reconfigure the urban landscape in alignment with sustainable land-use, architecture and transport planning principles, fostering an interconnected and functional built environment.

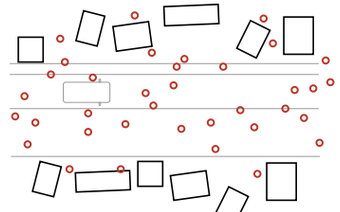
The theories of Jan Gehl, who emphasised the importance of designing cities on a human scale, are particularly relevant in this context. In Gehl's words, "first life, then spaces, then buildings", suggests that the focus should be on the activities and needs of the inhabitants rather than on the built infrastructure (Gehl, 2011). Gehl's visions is about creating cities that are walkable, bike-friendly and full of vibrant public spaces that foster social interaction and enhance quality of life.

The existing built fabric of Belhar is characterised by sprawling per-urban areas and suburban zones, focused predominantly on motorised public transport. As per Robert Cervero's Transit-Oriented Development Theory, a strategy is proposed that seeks to balance the demands of private and public transport, while also advocating non-motorised transit options (Cevero, 1998). This approach envisions Belhar's built fabric evolving to encourage inclusive, accessible and sustainable mobility.

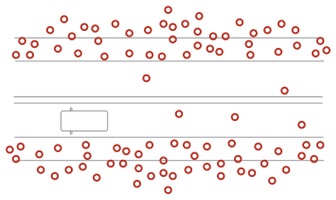
Belhar's low-density housing, compounded by the relatively small portion of land allocated to streets, offers a unique opportunity to reimagine the spatial structure. The theories proposed by Kevin Lynch and his emphasis on the legibility of the cityscape underpin the proposed reconfiguration of Belhar's spatial layout. By increasing street connectivity, the plan aims to foster community interaction and enhance mobility, this redesigned built environment should promote walking and cycling thereby bolstering urban mobility (Lynch, 1964).

The challenge of implementing integrated land-use and transport planning in a historically layered context like Belhar can only be successful by understanding the role of user behaviour, and preferences, arguing that successful urban spaces are ones that resonate with the patterns and rhythms of the users' lives.

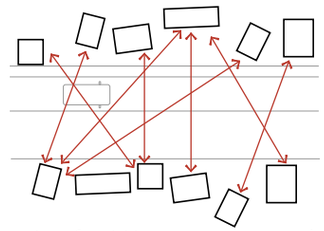
Cement Railway vs Belhar Drive Movement Patterns



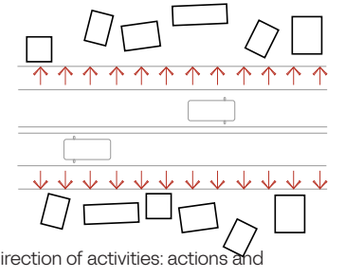
movement pattern: pedestrian traffic is unrestricted and expands with few limits



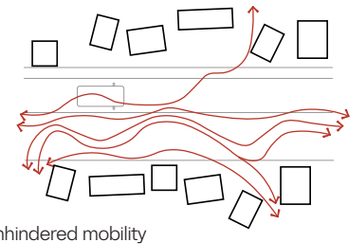
flow of pedestrian: the majority of human traffic is channeled along the sidewalks



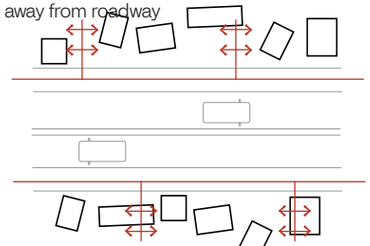
orientation of activities: engagements and activities occur in many directions



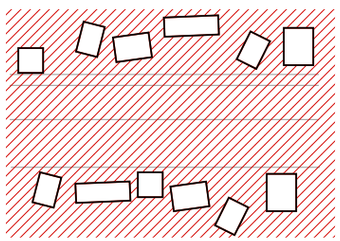
direction of activities: actions and interactions primarily occur in a direction away from roadway



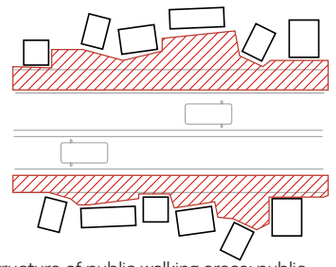
unhindered mobility



organised motion: movement tends to follow a specific controlled path



nature of public walking areas: pedestrian movement is open



structure of public walking areas: public pedestrian spaces are defined by clear boundaries

Figure 46: Davis, S (2023). Diagrams representing spatial dimension of movement along cement railway movement route and Belhar drive

Transient Space in Transit Infrastructure

Transient spaces, like those found in the Pentech Metrorail Station and along the movement routes of Belhar, constitute areas that individuals traverse but seldom occupy for extended periods of time. These spaces, tucked into the intricate network of public transportation systems often include platforms, ticketing areas, and the connecting passages leading to exits or other platforms. In pedestrian routes, these transient spaces can be seen as footpaths, crosswalks and overpasses. Such spaces are inherently designed to facilitate movement and transition, with their primary function being transportation. They are not intended for stationary activities or long-term habitation but rather to guide individuals from one point to another.

A primary concern that transient spaces explore is the idea of 'non-place', a term popularised by French anthropologist Marc Auge. According to Auge, a 'non-place' or 'non-space' is a location that does not hold enough significance to be considered true 'places' (Conley, 2017). When examined through this lens, the Pentech station and the pedestrian routes of Belhar typify 'non-spaces'. They lack personal resonance or identity and are seen primarily as transit points or routes that individuals navigate to reach their destinations. The repeated, often rushed interactions with these spaces don't allow for the development of personal connections or meaningful memories, causing them to be perceived as impersonal and inconsequential. From the perspective of a daily commuter, the Pentech station is merely a part of their daily journey, and the walking routes of Belhar are simply a means to an end. These locations serve a [critical] functional purpose, but don't often engender a sense of belonging or community. They lack the personal, social, and cultural associations that typically transform a 'space' into a 'place' with communal value.

This perceived anonymity and lack of attachment have contributed to a host of issues in Belhar. The transient nature of these spaces has led to a detachment among users, making community-led initiatives for improvement or preservation less likely. Without a sense of personal or mutual investment, community members are less inclined to maintain or protect these spaces, leading to neglect and deterioration over time.

Furthermore, these 'non-places' can inadvertently encourage anti-social behaviour. For instance, the impersonal nature of the Pentech station and the pedestrian routes in Belhar can make them attractive to criminal elements who exploit the lack of community oversight. The result is a self-perpetuating cycle where safety concerns further discourage community interaction and engagement. Moreover, the lack of meaningful social or cultural connections within these spaces can amplify feelings of alienation and disconnection among resident. These spaces, while used frequently, do not inspire communal gatherings or foster social connection, resulting in missed opportunities for community building and cohesion.

However, the perception of a space as 'transient' or 'non-place' is subjectively determined. To the daily commuter, a train station may merely be a non-space, a necessary point of transition. Yet, to a member of staff or a vendor who spends significant time there, this same space could morph into a meaningful 'place', bearing a direct connection to their livelihood.

The feelings evoked by these transient spaces are often ones of indifference or disconnection. Their lack of identity or personal resonance often renders them as merely utilitarian, devoid of comfort or familiarity. This can contribute to a sense of alienation and disengagement among those who traverse these spaces daily.

However, these transient spaces, despite their inherent anonymity and detachment, hold a great potential to be transformative, serving more than just their utilitarian purpose. Through strategic interventions, these spaces could be reimagined and repurposed to foster community interaction and social cohesion.

In essence, the challenge lies in transitioning these spaces from being just 'transient' to becoming 'transitional' – spaces that not only facilitate movement but also contribute to the creation of social and cultural connections. It's about transforming the narrative of these spaces from being non-places' to becoming 'places' with a sense of purpose and identity.

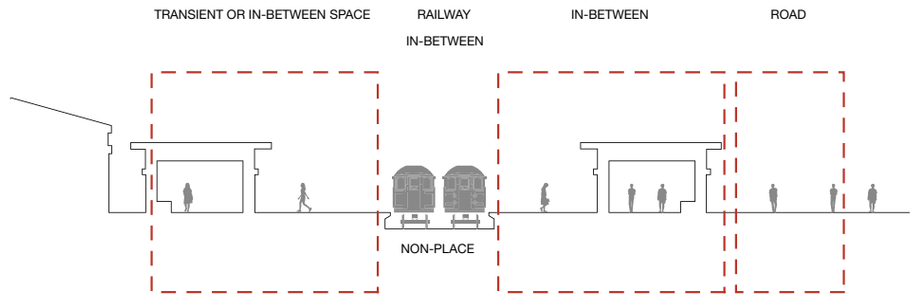


Figure 47: Davis, S (2023). Section representing transient space at Pentech Metrorail Station

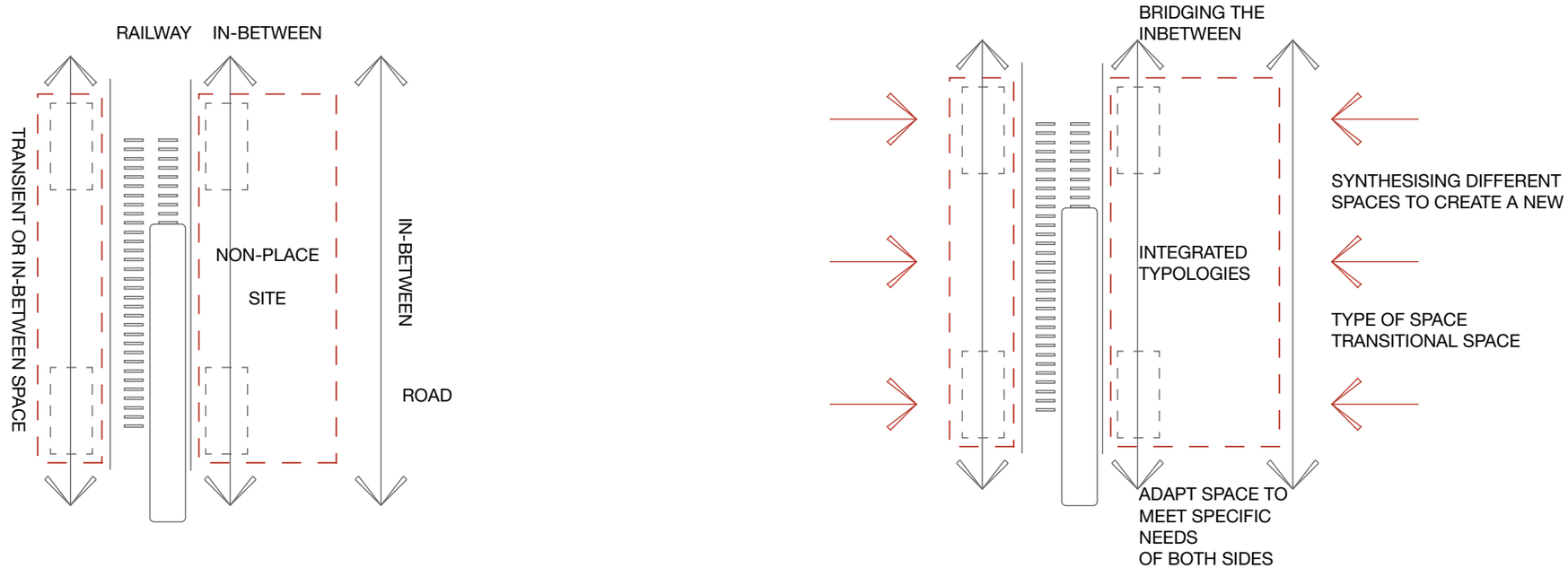


Figure 48: Davis, S (2023). Plan representing transient space at Pentech Metrorail Station

Case Study - Adressing Public Space Issues through Small Scale Interventions

FURNISH Project

The Fast Urban Response for New Inclusive Spaces and Habitat (FURNISH) project sets a compelling precedent in the realm of urban revitalisation. FURNISH is a European project that employs digital technologies such as Computer Numerical Control (CNC) and Computer-Aided Manufacturing (CAM) to rapidly and innovatively transform public spaces (EIT Urban Mobiltiy, 2021). Its vision is to foster urban regeneration by creating interactive, multifunctional and flexible urban furniture to repurpose unused urban spaces or transient spaces.

FURNISH not only champions the transformation of urban spaces but also emphasises community involvement and consultation during the design process. Its unique approach ensures that the created spaces are tailored to meet local needs and aspirations, making the spaces not just functional but also cherished by the people who interact with them daily.

Moreover, the FURNISH project leverages open-source designs and local manufacturing. This means that the designs created under the project are available to the public, inviting others to use, modify and adapt them according to their needs. It is a democratic approach to urban development that promotes inclusivity and wider community engagement.

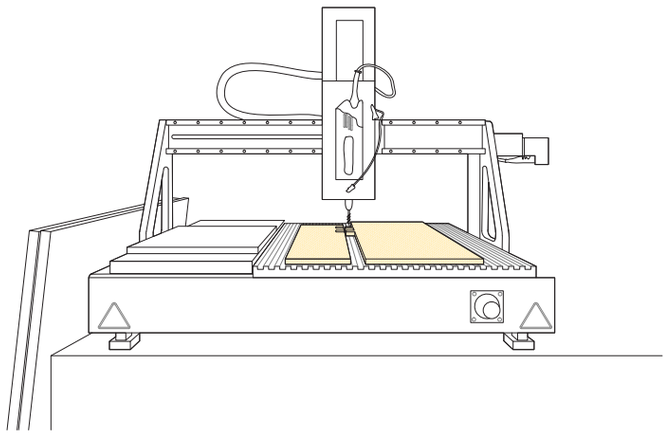
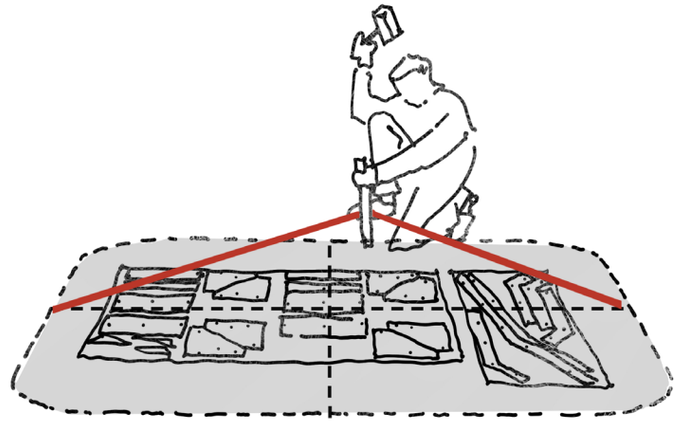


Figure 48: Davis, S (2023). Diagram representing student participation in FURNSIH PROJECTS
Figure 49-53: Images from FURNISH Fast Urban Responses for New Inclusive Spaces and Habitat (n.d) [image]. Available at: https://furnish.tech/ (Accessed: 3 August 2023)



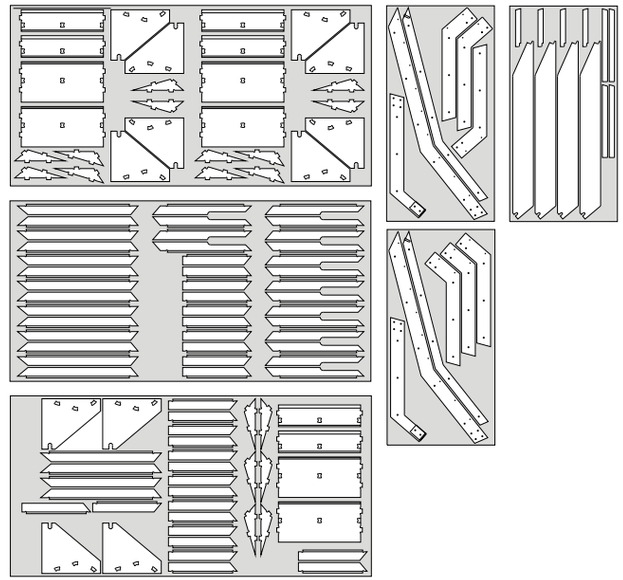


Figure 48: Davis, S (2023). Diagram representing student participation in FURNSIH PROJECTS
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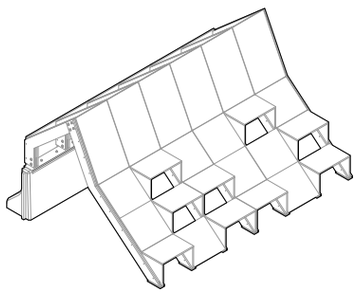
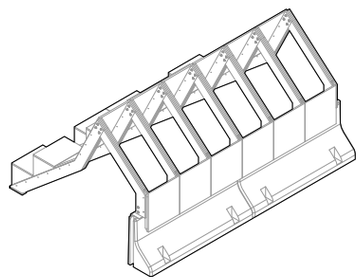
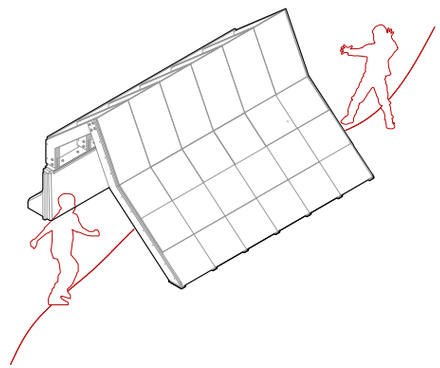
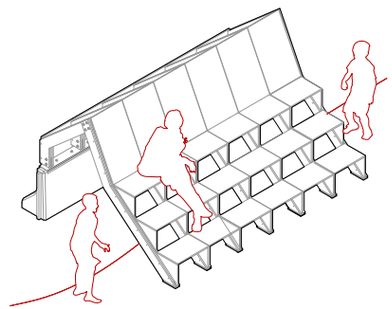


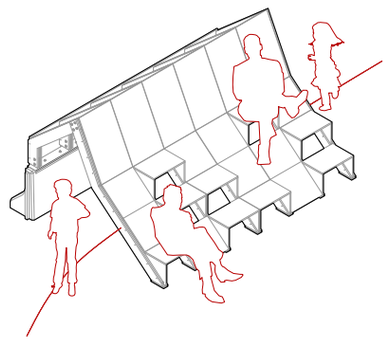
03: WOOD MODULES, SLOPES, STEPS AND BARRIERS.
FRONT VIEW



03: WOOD MODULES, SLOPES, STEPS AND BARRIERS.
BACK VIEW







Theorising how ‘FURNISH’ could be applied in Belhar Context

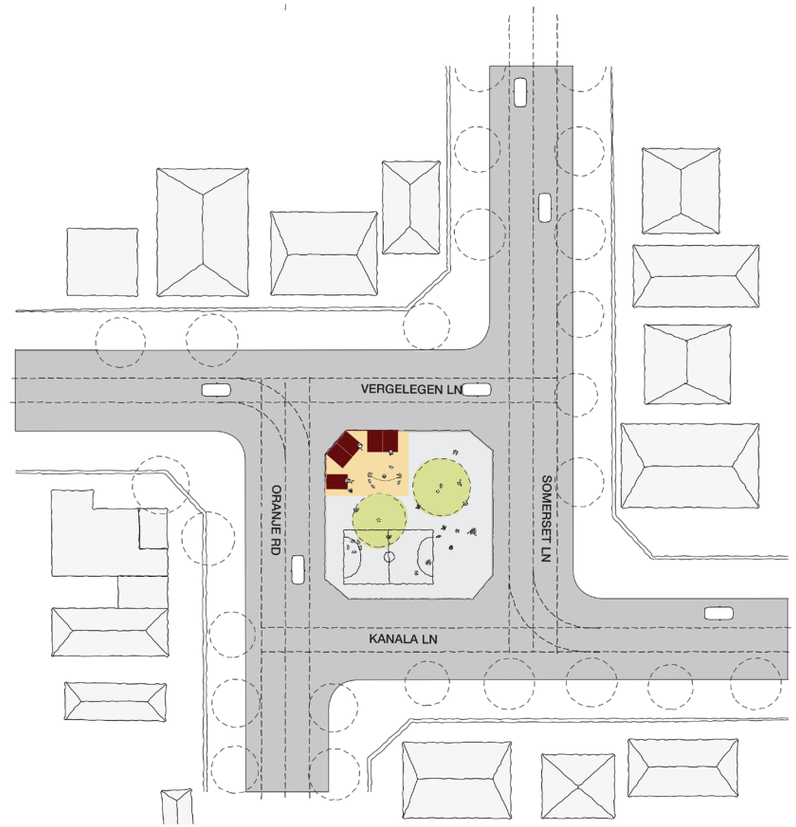
The FURNISH initiative could serve as an inspiring model for the Cape Peninsula University of Technology to establish a similar program at the Pentech Metrorail station which it borders. Such a program could actively involve its built environment students, applying academic theory to real-world situations and fostering positive community interactions.

The potential program could draw from FURNISH’s methodology, focusing on local engagement and consultation during the design process (EIT Urban Mobility, 2020). The students would be encouraged to work closely with the community, understanding their needs and aspirations, thereby ensuring the design is both functional and appreciated by those who will be using it. This participatory approach could allow students to learn about the human side of design and planning, appreciating the nuances and value of community involvement in urban development.

In line with FURNISH’s use of innovative, open-source designs and local manufacturing (EIT Urban Mobility, 2020), CPUT students could be challenged to come up with creative design solutions. These designs would then be available as open-source resources for local communities, fostering a more inclusive and democratic approach to urban development.

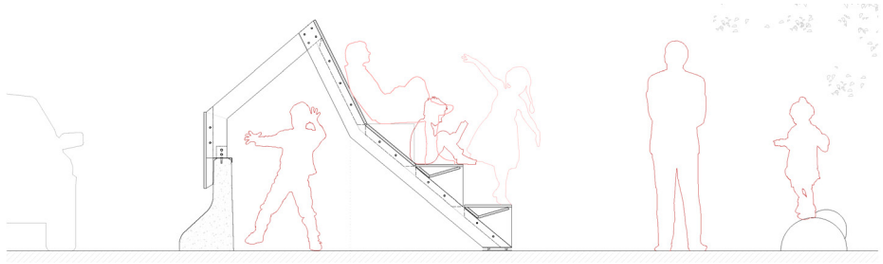
By involving students in this way, CPUT would be providing them with a hands-on learning experience that complements their academic studies. Not only would this enhance their practical skills and knowledge, but it could also foster a stronger sense of civic responsibility and social consciousness.

In essence, creating a program inspired by FURNISH at CPUT could serve to bridge the gap between academic learning and practical application, allowing students to positively impact their community while gaining valuable experience in their field.

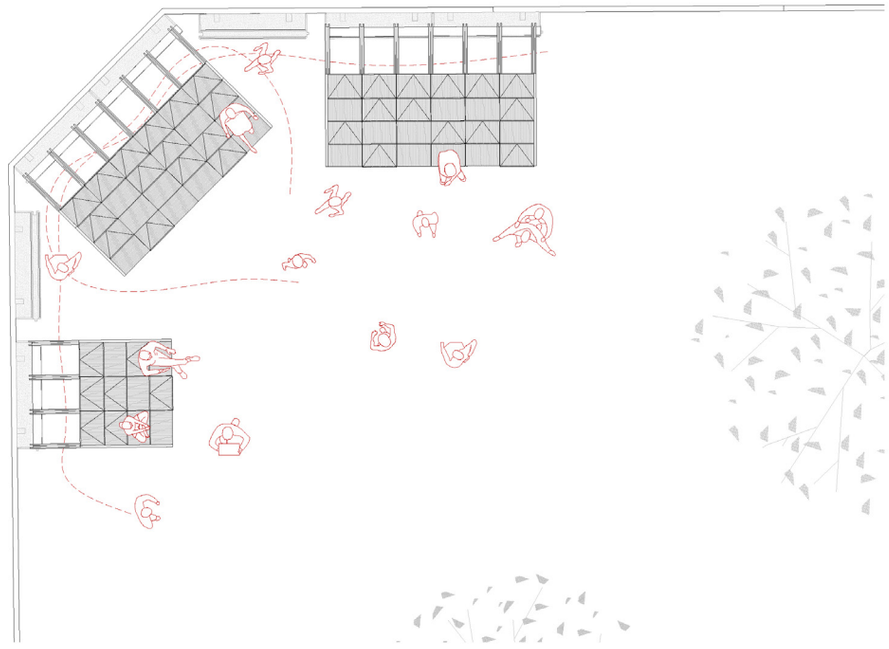


+ Exploring revitalisation of existing urban spaces

Figure 54-57: Diagrams theorising how FURNISH could be applied Images from FURNISH Fast Urban Responses for New Inclusive Spaces and Habitat (n.d) [image]. Available at: https://furnish.tech/ (Accessed: 3 August 2023)
Figure 58: Davis, S (2023). Plan theorising how FURNISH could be applied in Belhar Public Spaces

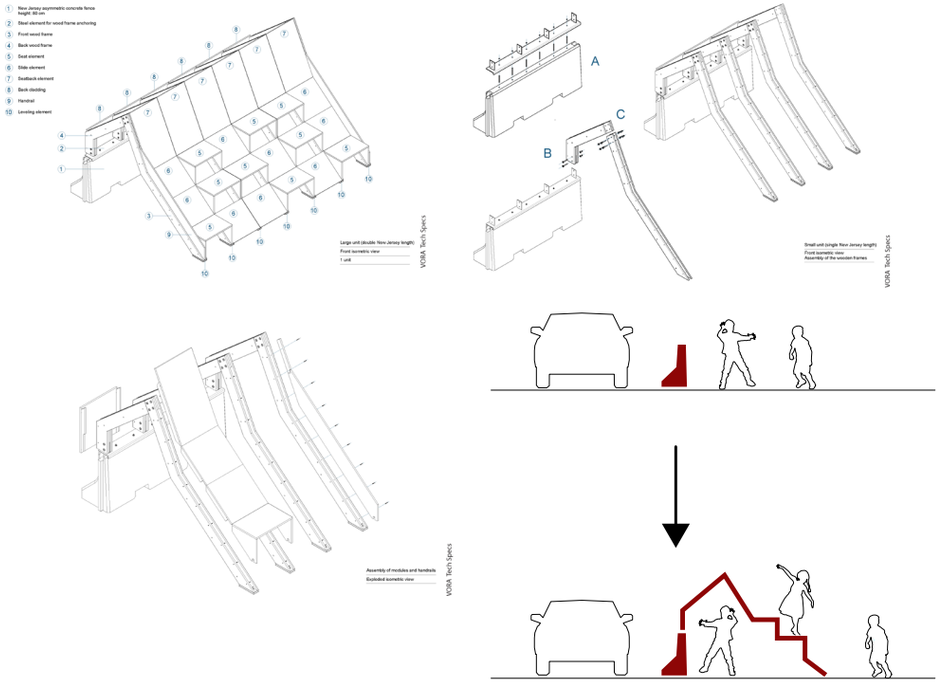


Section Diagram: FURNISH urban furniture. (n.d) [image]. Available at: https://furnish.tech/ (Accessed: 3 August 2023)



Site Plan Diagram: FURNISH urban furniture. (n.d) [image]. Available at: https://furnish.tech/ (Accessed: 3 August 2023)

Exploded Axonometric: FURNISH urban furniture. (n.d) [image]. Available at: https://furnish.tech/ (Accessed: 3 August 2023)



Section 5 I Case Studies

A Pathway to Informed Design

In the pursuit of an architecture that resonated with the core human experience and urban dynamics, it becomes pivotal to venture beyond theoretical understanding. This project undertakes the exploration of various case studies, not just as isolated architectural marvels but as living embodiments of spatial functionality, material innovation and social engagement.

The reason behind delving into these case studies is multifaceted. Primarily, these studies share similarities with the envisioned project in terms of desired spatial and programmatic qualities, as well as innovative utilisation of material palettes. Analysing these characteristics in existing structures provides a window into real-world application and possible successes and failures.

Through the technical studies that follow, an analytical lens will be cast upon these case studies. This lens will not only decipher the structural and functional aspects but will also explore the subtler nuances of how materials interact with space, form and human movement.

This analytical approach serves to inform a design intent focused on connecting various elements through different forms of movement, fostering a sense of place and enhancing transparency. These insights lay the foundation for an informed design process, empowering the creation of architecture that is not merely a physical structure but a connector of various elements.

Baragwanath Transport Interchange & Traders Market

Ludwig Hansen Architects & Urban Designers

UNDERSTANDING THE CONTEXT

The Baragwanath Transport Interchange and Traders Market, situated in Soweto – South Africa's largest township, is more than just a transport hub. Conceptualised and designed by Ludwig Hansen Architects and Urban Designers, it embodies an integrated urban development model with elements of public transportation, commercial activities and public spaces. Spanning over a 1300 metre linear site along the Old Potchefstroom Road, this principal artery leading into Soweto, the hub takes on a strategic role in urban Connectivity.

The interchange forms a critical part of the broader Baralink Development Framework established by the Greater Johanesburg Metropolitan Council. Baralink is a transformative initiative aimed at integrating Soweto with Johanesburg, thereby strengthening urban ties and enhancing regional mobility (Greater Johannesburg Metropolitan Council, 2009). The Baragwanath Transport Interchange, as part of this framework, serves as an essential conduit connecting various urban nodes, thus fulfilling a significant role in the regional transport network.

As a central transport hub, the interchange offers several transportation options, providing essential links within and outside Soweto. Additionally, it incorporates commercial elements through the Traders Market, accommodating local vendors and businesses and thereby boosting economic activity (Hansen, 2010). The project was developed to improve regional connectivity, foster economic growth and enhance public life by offering safe, functional and user-friendly spaces for both commuters and traders.

MATERIALITY

The interchange adopts a unique approach to its construction, deviating from the conventional use of lightweight materials like steel and glass in transport infrastructure. Instead, this project integrates more robust and enduring materials, specifically brickwork and off-shutter concrete (Hansen, 2010). Brickwork, besides being cost-effective and fire resistant, brings an increased thermal mass to the structure, making it suitable for South Africa's climate. It provides resistance to moist weather conditions while adding a sense of permanence and solidity. This property of thermal mass allows the structure to absorb and store heat during the day and release it slowly at night, thereby moderating internal temperature fluctuations and enhancing comfort for users. Concrete, particularly off-shutter concrete, provides flexibility in finishes. It can offer smooth, textured or natural surfaces contributing to the aesthetic quality of the project.

Furthermore, the choice of robust and durable materials such as concrete is essential in ensuring the longevity and resilience of the structure. The use of these materials not only provides a solid, secure and low maintenance infrastructure but also contributes to cost-effectiveness in the long term (Mehta, 2006).

The choice of materials significantly influences how users perceive and interact with the space. Their robust and tactile nature offers a feeling of safety adds a unique sensory dimension to the user experience, and symbolises the enduring significance of the structure within the community (Pallasmaa, 1996).

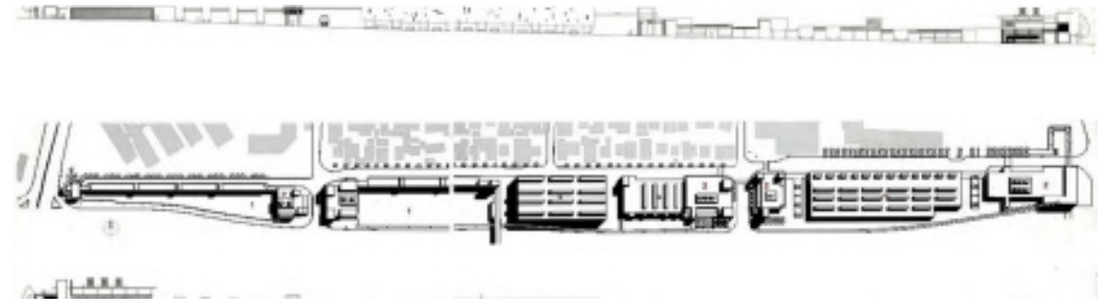


Figure 60: Site Plan and section of Baragwanth Transport Interchange from archiDATUM(n.d) [image]. Available at: hhttps://www.archidatum.com/projects/baragwanath-transport-interchange-and-traders-market-urban-solutions-architects-and-urban-designers/ (Accessed: 1 August 2023)
Figure 61-64: Images of Baragwanth Transport Interchange from LHA + Ud (n.d) [image]. Available at: https://www.ludwighansen.co.za/project/baragwanath-taxi-rank/ (Accessed: 1 August 2023)

Figure 65-68: Images of Baragwanth Transport Interchange from LHA + Ud (n.d) [image]. Available at: https://www.ludwighansen.co.za/project/baragwanath-taxi-rank/ (Accessed: 1 August 2023)

STRUCTURAL DESIGN AND INFLUENCE ON USER BEHAVIOUR

The design of the Baragwanath Transport Interchange employs a unique structural concept that notably shapes user interaction and functionality within the space. A key design element is the structural 'spine', an elongated arcade that forms the backbone of the project. The design concept establishes a clear circulation route for users, leading them intuitively through the space. A harmonious interplay of solid and void spaces in the concrete structure, complemented by strategic openings, encourages interaction and prevents feelings of being confined (Hansen, 2010). These design aspects influence user behaviour, making the space more inviting and user-friendly.

LANDMARK TOWERS AND SPATIAL ORIENTATION

Integral to the interchange's design is the incorporation of landmark towers. These structures play a significant role in facilitating spatial orientation for the users. Serving as visual markers, the towers punctuate the arcade, helping users to identify their position within the extensive length of the site and navigate accordingly (Hansen, 2010).

The landmark towers, by virtue of their visual distinctiveness, offer a straightforward way to comprehend the spatial organisation of the vast transport hub. They contribute to the overall legibility of the design, allowing users to orient themselves with minimal effort. In a bug as bustling as Baragwanath, this aspect of the design brings coherence and ease of navigation, enhancing user experience significantly.

BUILDING FORM

The long, narrow layout of the interchange is a response to the site's linear shape. This form factor plays a unique role in the users experience of the space, especially concerning natural light. The length of the building, combined with the site's narrow width allows for a generous influx of sunlight throughout the day (Hansen, 2010). This aspect is particularly beneficial during the colder months, providing warmth and brightness to the space. The abundance of natural light not only contributes to a more enjoyable environment to commuters and traders but also enhances the buildings energy efficiency.

RELATIONSHIP TO MOBILITY

The Baragwanath Transport Interchange stands as an exceptional example of mobility design, carefully considered to ensure seamless, intuitive navigation. Its unique, elongated design along the Old Potchefstroom Road supports the smooth flow of people through the space.

The 'spine' concept, facilitates seamless transitions between transport stations and various facilities. This setup contributes to an easy, uninterrupted flow of movement. It caters effectively to the mobility needs of a diverse range of users, from everyday commuters to traders, offering a space that effortlessly guides movement and activity (Hansen, 2010).

SAFETY AND CONTROL

Safety has been crucial concern in the design and operation of the interchange. This consideration is evident in the allocation of well-defined circulation paths, clear sightlines, and the strategic positioning of public amenities along these routes. These design choices ensure visibility and transparency throughout the hub, deterring potential antisocial behaviours and fostering a sense of security among users.

In addition, the segregation of transportation modes – with dedicated facilities for buses and taxis – serves to manage potential chaos and mitigate safety risks associated with traffic and pedestrian movement. Lastly, the inclusion of management offices within the complex supports active monitoring and response to any security issues, further fortifying safety measures within the interchange (Hansen, 2010).

CONCLUSION

Through a comprehensive study of the Baragwanath Transport Interchange and Traders Market, this investigation offers insights into how technical considerations, such as structure and material selection profoundly influence user behaviour. Furthermore, it underscores how thoughtful design can support and enhance mobility within a bustling urban space. The project stands as a testament to the power of thoughtful integration of robust materials, intuitive design layout and careful mobility planning, culminating in a space that is not just functional and durable but also engaging and user friendly (Hansen, 2010).

Ubuntu Centre

Field Architecture

UNDERSTANDING THE CONTEXT

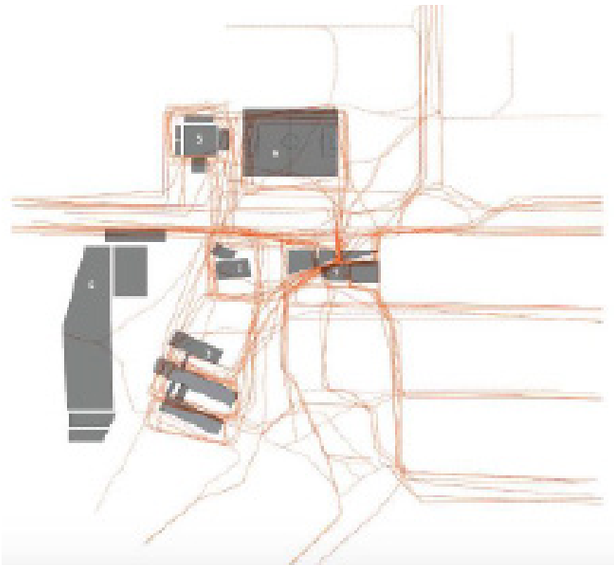
The Ubuntu Centre, located in the township of Zwide, Port Elizabeth, stands as a testament to the transformative power of design. This architectural project, designed by Stand Field, aims to uplift vulnerable children and families from the generational cycle of poverty (ArchDaily, 2011). It achieves this through offering comprehensive services such as paediatric HIV testing and treatment, counselling, education and community empowerment (Findley, 2011).

The centre's location within an educational precinct amongst five other schools, a library, a post office, retail spaces, and small to medium-sized businesses, offers a microcosm of the larger community. This thoughtful integration of the centre within its surrounding highlights a conscious design response to the local context, fostering a deeper connection between the centre and the community it serves (Field & Field, 2012).

EXISTING PEDESTRIAN PATHWAYS AND SOCIAL INTEGRATION

One of the distinctive design features of the Ubuntu Centre is its innovative use of existing pathways (ArchDaily, 2011). Field observed that residents of the township traversed along informal paths that were the shortest distance between shops, transport stops and other prominent destinations, therefore requiring the least energy consumption. Instead of creating a closed boundary, Field transformed this observation into a user-friendly pathway that runs through the building (Findley, 2011). This 'shortcut' along with the combination of community activities, encourages social interaction, facilitates social exchange, and reduces stigma by providing discreet access to the centre's services such as the HIV testing facility (Field & Field, 2012).

The design strategy has multiple benefits. Firstly, it allows the centre to seamlessly integrate into the existing community structure, physically connecting with the surrounding environment. Secondly, it subtly upholds the Ubuntu philosophy of communal interdependence. The pathways become a tangible embodiment of community connectivity, reminding users of the power of collective cooperation and unity (Laylin, 2011).



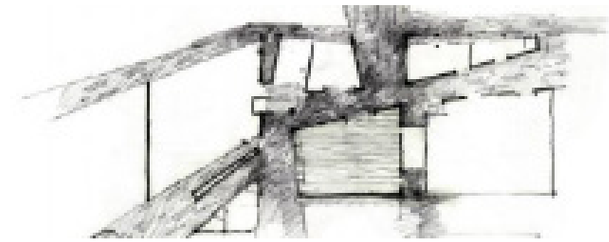


Figure 69-70: Images of Ubuntu Centre. Findley, L. 2011. Ubuntu Centre [Online]. Architect: The Journal of the American Institute of Architects. Available: https://www.architectmagazine.com/design/buildings/ubuntucentre_o [Accessed 20 December 2019 2019].
Figure 71: Image representation of design in response to exisiting movement patterns. Field, S. & Field, J. 2012. Designing Ubuntu: A Community and Health Centre in South Africa

STRUCTURE AND MATERIAL EXPRESSION

The centres architectural design is characterised by its interlocking reinforced concrete planes, a symbolic gesture representing the mutual support intrinsic to the concept of Ubuntu (Field & Field, 2012). The choice of materials – predominantly concrete – signifies commitment to longevity and permanence in a context that has experienced its fair share of instability (Findley, 2011).

Contrasting the solidity of the concrete, expansive sections of glazing illuminate interior spaces, promoting openness and transparency. Additional warmth, texture and interest are introduced through the strategic use of treated timber elements. The combination of these materials encapsulates an effective balance between resilience and welcoming ambiance (Laylin, 2011).

PROGRAMMATIC FLEXIBILITY

The Ubuntu Centre demonstrates a diverse range of functional spaces that cater to the community's needs. These include an HIV/TB clinic, a community kitchen, an empowerment wing offering career guidance and computing facilities, administrative offices, and an organic rooftop garden. The building's inherent design flexibility allows it to adapt to the evolving community needs, exemplified by the introduction of early childhood development classes and Montessori-inspired curriculum (Field & Field, 2012).

PASSIVE DESIGN STRATEGIES

The Ubuntu centre embodies the principles of sustainable architecture, incorporating several passive design strategies for enhanced energy efficiency and cost affordability (Field & Field, 2012). Expansive curtain walls and skylights ensure maximum daylight penetration, reducing the need for artificial lighting and subsequently, electricity costs. These glazed sections, with their thermally efficient double-glazing construction, serve a dual purpose; they contribute to the thermal comfort by preventing excessive heat gain or loss, and they enhance the visual connection between the interior spaces and the surrounding community (Laylin, 2011).

Openable window sections promote a natural ventilation, reducing reliance on mechanical ventilation systems, thereby contributing to cost efficiency (Findley, 2011).

A rooftop garden further contributes to the building's insulation, thereby reducing energy demands for heating and cooling (Findley, 2011). Moreover, the garden utilises grey water from the building for irrigation, underlining the centre's commitment to sustainable practices and resource efficiency (Field & Field, 2012). The system collects and treats wastewater from sinks, shower and laundry facilities within the centre, repurposing it for the irrigation of the rooftop garden. The reuse of grey water not only conserves waste but also contributes to the affordability of the centre's operations, reinforcing its sustainable ethos and commitment to resource efficiency (Laylin, 2011).

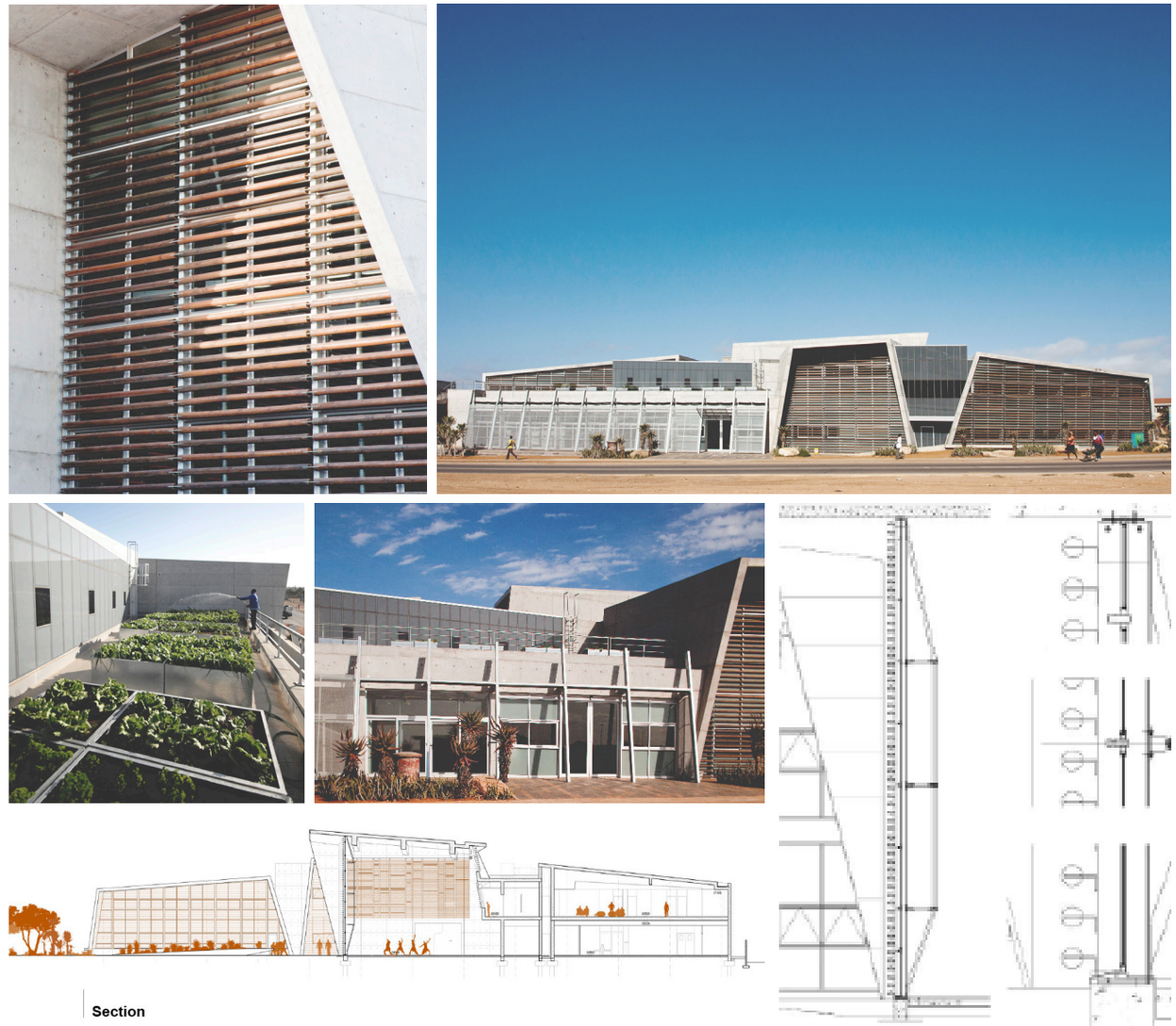


Figure 72-73: Detail Section and Elevation of Ubuntu Centre. Field, S. & Field, J. 2012. Designing Ubuntu: A Community and Health Centre in South Africa
Figure 69-70: Images of Ubuntu Centre. Findley, L. 2011. Ubuntu Centre [Online]. Architect: The Journal of the American Institute of Architects. Available: https://www.architectmagazine.com/design/buildings/ubuntucentre_o [Accessed 20 December 2019 2019].

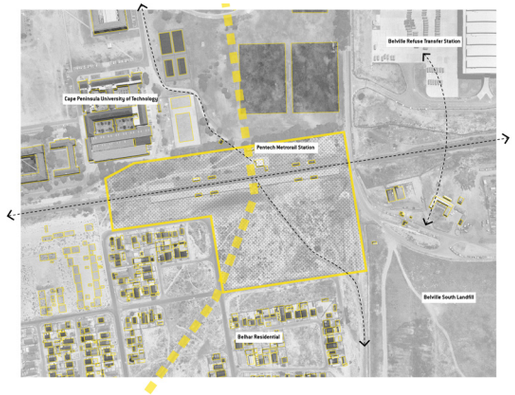
Architectural Considerations derived from Case Studies

Understanding the inherently urban scale and nature of this dissertation necessitates the embrace of architecture's profound role as a facilitator and organiser of social interaction. This perspective aligns with the insightful work of city planning scholar, Kevin Lynch, whose seminal research shapes the foundation of the projects designs considerations.

Lynch's influential book, the "Image of the City" (1960), presents a powerful framework through which we can comprehend how individuals perceive, navigate and structure their understanding of urban landscapes. Through his identification of five elemental components – districts, landmarks, nodes, paths and edges – Lynch elucidates the consistent and predictable ways in which urban users construct their mental maps of the city (Lynch, 1964).

While Lynch's work may predominantly focus on the urban scale, it's worth noting the argument put forth by Brian Edwards, in his book "Sustainability and the Design of Transport Interchanges" (Edwards, 2011). In his research he posits that the principles laid out by Lynch are fully transferrable and highly applicable to the design of transport interchanges and buildings. This valuable insight serves as a catalyst for translating Lynch's urban-focused elements into the more specific domain of transport architecture.

With these conceptual tools, the subsequent section will delve deeper into each of Lynch's five elements in the context of this dissertation:



DISTRICT

In his work. Lynch characterises a district as an area with a unique and recognisable character (Lynch, 1964). When translated into transport architecture, it becomes evident that these structures and systems have their own distinctive typologies and functions. This distinctive character provides transport areas with their own personality and identity, while also shaping the overall area. Within this context, the transport district emerges as a tapestry woven from the interaction between transport systems and pedestrians, adding an extra layer of complexity to the system.

This conception of a district brings into the focus the need to consolidate open space within architectural design (Edwards, 2011). The perception of space as a valuable resource underlines the importance of preserving a majority of public open spaces, even while maintaining a compact building footprint. In an urban context, these open spaces become pivotal for community gatherings, social activities and fostering social integration. They contribute to enhancing safety through effective site surveillance, facilitated by a smaller building footprint.

Furthermore, strategically positioning the building to optimise sunlight in open areas and peripheral zones of the site can ensure good street access. This careful balance between the built form and open space leads to the integration of the building within its surrounding landscape. By considering the district and consolidation of open space, the design can strike a harmonious balance that respects the existing landscape while adding its own distinctive character.

PATHS

In the realm of transport and architectural design, paths hold a fundamental position, as described by Lynch (Lynch, 1964). These paths, whether tread by foot, navigated by car, or travelled by public transport, significantly shape the experience and perception of transport. The experience gets enriched when different modes of transport interact along the same route, offering varied perspectives and spatial understandings.

Knowledge of spatial geometry, arguable, is often derived from the routes we traverse and the speed at which we do so. Therefore, the design of these paths – these primary vehicles of navigation knowledge – should aim to be more memorable, enhancing the overall transport experience (Edwards, 2011). Echoing this sentiment, Edwards emphasises the absence of pleasure in using interchanges that lack such memorable routes.

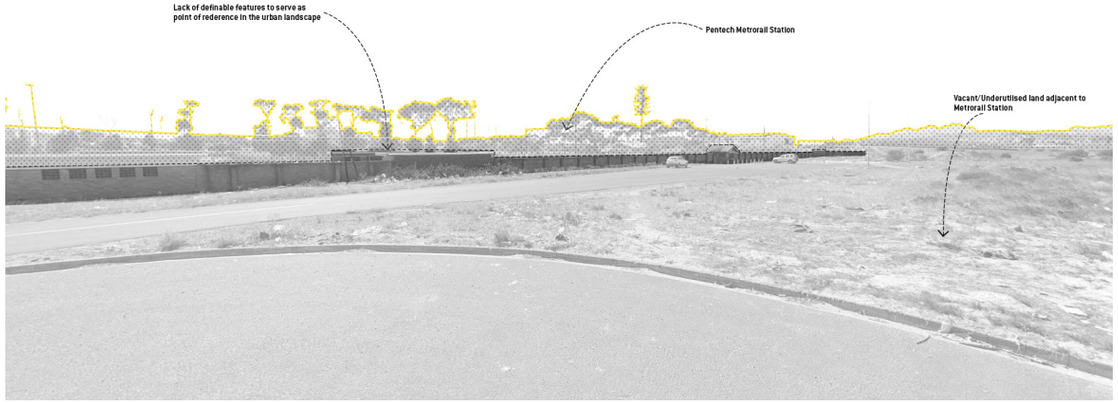
Furthermore, a crucial aspect of design lies in the integration of existing movement patterns and pathways within the surrounding environment. If a popular pedestrian path, for instance, passes through the site, it should ideally be incorporated into the design rather than obstructed. This inclusion not only boosts the structure's accessibility but also fosters a sense of familiarity among the local community members. By doing so, it enhances the sense of belonging and acceptance of the new architectural intervention within the environment, tying in seamlessly with the established urban fabric.

EDGES

Lynch describes edges as the boundaries of perception, often delineated by transport barriers that separate one form from another (Lynch, 1964). The railway line at the Pentech station can be seen as such a barrier. In the context od this dissertation, the station is devised to bridge these boundary conditions, thus facilitating accessibility and seamless movement.

Ensuring accessibility is a fundamental concern of architectural design, as it embraces an inclusive approach that permits all individuals to use, enjoy and participate in the built environment. In this context, a physical bridge has been incorporated at the Pentech station crossing the railway tracks, providing a clear and safe path for commuters and other users. This solution not only physically connects disparate spaces but also encourages crossing perceptual barriers, leading to the integration of various city elements.

However, accessibility extends beyond just physical navigation. The design should also be intuitively understandable, catering to a wide range of users with different abilities and needs. Going beyond physical and sensory considerations, accessibility also implies a sense of ownership and connection. The users should feel that the space is theirs to use and enjoy, thereby enhancing their experience and engagement with the built environment. The thoughtful integration of edges and their conversion into accessible routes is a critical strategy in achieving this goal.

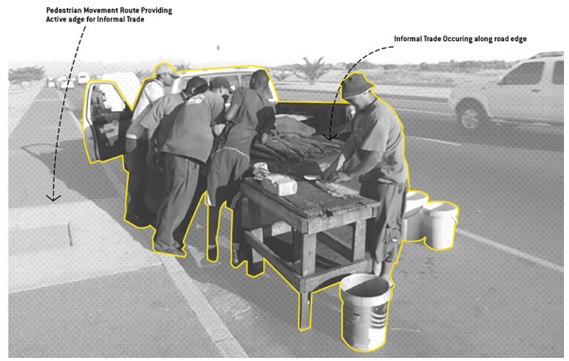


LANDMARK

A landmark, according to Lynch, serves as a critical point of reference within the urban fabric, and in the realm of transport interchanges, the station itself can become a prominent landmark (Edwards, 2011). However, a landmark is not just about its physical structure. It also represents a significant place in the urban narrative and resonates in the collective memory of a city's residents.

In conjunction with the concept of landmarks, the principle of architectural legibility comes into play. For large public buildings and transport hubs, such as the Pentech Metrorail Station, the efficient movement of users is paramount, therefore the design of the building's layout must be intuitive and logical, enabling users to navigate the structure with ease.

This ties back to the concept of landmark, as within the building, landmarks can serve as points of reference, aiding in orientation and pathfinding. These landmarks could range from distinctive architectural features, such as unique façade treatment, to specific areas like a central atrium or significant artwork installation.
Therefore, an interplay between the landmark as an urban signifier and the principle of legibility in architectural design can create a user-friendly, memorable transport interchange that holds its own in the urban fabric and the minds of its users.



NODE

Lynch describes a node as a place where human activity and commercial use intensify, demonstrating a fundamental aspect of urban and transport design. The Pentech station, in the broader urban context, serves as such a transport node. The design envisions an increase in educational, social and economic interaction, transforming the station and its interchanges into critical nodes in a landscape scattered with micro nodes of socio-economic activity. Lynch's argument maintain that spaces become more memorable with increased interaction, particularly in a social nature.

This understanding of a node aligns with the need for programmatic flexibility in architectural design. As the needs of users and community change over time, it is essential that nodes are capable of adapting to serve different functions (Edwards, 2011).

The design should not only accommodate the station's role as a bustling node of activity but also remain resilient and versatile enough to keep pace with evolving circumstances, from technological advancements to societal shifts. Consequently, this alignment of Lynch's concept of a node with the programmatic flexibility ensures the creation of a dynamic, adaptable and memorable transport environment.

Technical Considerations

Achieving an efficient and integrated public transport system stands as a paramount priority in South African cities. Public infrastructures, particularly transport interchanges, offer a wealth of opportunities for multifaceted engagement. Not only do they serve as transit hubs, but they also have the potential to be thriving centres for social integration, community involvement, employment generation and much more.

The aspiration to create these multifunctional spaces in the context of South Africa is not without its challenges. Integrating various social functions together with transport systems presents infrastructural complexities that require careful consideration and planning.

When designing these civic infrastructures, architects and planners must strive to create spaces that resonate with the community's needs and aspirations. The challenge lies in crafting architecture that not only suits the community's endeavours but also foster a sense of ownership, identity and pride.

In South Africa, transport interchanges and renewal projects manifest in various scales, spatial planning and typologies. Notable examples include the Baragwanath Transport Interchange and the Ubuntu Centre. These projects, although diverse, share a common goal: to create civic buildings that respond functionally to transit and community needs.---

Drawing from the case studies and combining them with other literature enables a conceptual exploration of the typologies, materials and amenities that can sustain both the public and social function, academic possibilities and mass commuting in the Belhar precinct.

ADAPTABILITY

In the rapidly evolving context of modern architecture, a design that is adaptable and dynamic is pivotal. The building must remain sensitive and responsive to varying user needs, environmental conditions and technological advancements. To achieve this, elements such as operable facades and smart technologies can be incorporate, these dynamic strategies allow for adjustments in the physical structure of the building, accommodating shifting user preferences or environmental conditions.

Enabling these interventions to be flexible within the urban fabric means more than immediate success: it lays the groundwork for future expansion and innovation. Such adaptable designs create momentum that opens doors for subsequent development and transformation, fostering an urban fabric that is in continuous evolution. It's a practice infused with a logic of opening and forward momentum, facilitating breakthroughs and embracing the inherent dynamism of the urban environment.

Moreover, it's important to ensure that adaptability doesn't compromise visibility and connectivity with the exterior environment. For example, the building, serving as a transport hub where people often wait for trains or taxis, visibility remains crucial. This can be achieved by incorporating permeable facades or glass walls which allow occupants to keep an eye on the arrival and departure of transport services. These elements can also create a sense of openness and connection with the surrounding context, enhancing the overall user experience.

The underlying essence of adaptability lies in its unceasing movement toward autonomy, its clever and dynamic nature that enables it to resonate with change. It's a quality that not only serves the present needs but also anticipates and paves the way for future demands and possibilities.

ROBUSTNESS

The matter of robustness in architectural design, particularly in South African transit architecture, opens up various avenues for material selection and application. A key aspect is the selection of building materials that are durable and resistant to wear and tear, vandalism and adverse weather conditions. This robustness however, is not simply about durability: it extends to resilience against an array of challenges and unpredictabilities.

Bricks, for instance, stand as a symbol of strength and permanence. Constructed with care, they have the ability to be economical, hard, durable and fire-resistant. They can be utilised in inventive ways to modify the building's thermal mass. This serves not only to bolster the structure's resilience to South Africa's cold and moist weather conditions but also to respond to the demands of complex logistics like transport interchanges which experience high influxes of daily commuters.

Off-shutter concrete too, lends itself to creative implementation. Primarily used for both load-bearing and non-load bearing elements, it holds the ability to be fashioned into either smooth or textured finishes. The formwork has the potential to dictate the finish, with textured effects achieved through attaching textured materials like form liners or treatments like bush hammering. This material, just like bricks, can be tailored to the specific needs of the project, while offering a sense of security, cost-effectiveness and aesthetic appeal.

These materials, infused with the principles of robustness, contribute to more than the physical attributes of the building. They also shape the systems and strategies within the design, reflecting thoughtful planning. This includes utilities and mechanical systems and the adaptability of interior spaces, ensuring that they can effectively respond to evolving use patterns and maintain efficiency over time. The challenge resides in finding the right balance, where the systems and strategies can effectively adapt to change.

PASSIVE DESIGN

Incorporating passive design strategies within the building is essential to improving energy efficiency and reducing reliance on active mechanical systems, thus contributing to the buildings autonomy. Strategies could involve optimising the buildings orientation, form and materials to harness natural light and ventilation, allowing the station to function with reduced reliance on people or things to keep it running.

The concept of autonomy in this context is multifaceted. It implies that intervention should exist as independent entities that challenge currently accepted patterns of urban ownership and governance. This addresses existing inefficiencies or malignancies in urban patterns; it explores ways to enhance current functioning; and it introduces sophistication where it is most needed.

Passive design also holds implications for the building's relationship with its physical infrastructure. Aiming for self-sustainability, it seeks a degree of independence from fallible systems. This consideration goes beyond merely following 'green' design trends. Instead, it embodies a crucial quality of responsible design, taking into account future implications of material and infrastructure choices.

Furthermore, the affordability factor is also crucial in passive design. The use of locally sourced, low-cost materials and construction methods can significantly reduce the building's upfront and operational costs, making it more accessible to a broader segment of the population.

Concluding Thoughts & Findings

To conclude these series of studies under theory and technology, the investigation into Belhar's urban landscape in this paper brings forth not only the necessity for enriched public spaces but also the urgent need for improved urban mobility with a context of economic challenge. The existing transport infrastructure in Belhar has often failed to serve the community adequately, creating barriers to opportunities and hindering social and economic growth.

Revitalising and enhancing the Pentech Metrorail station emerges as a symbol of the broader ambition to transform urban mobility in Belhar. This project is not just about rejuvenation but about rethinking how transportation can be integrated into the daily lives of people, catering to their evolving needs and facilitating greater connectivity within the community and to the wider city.

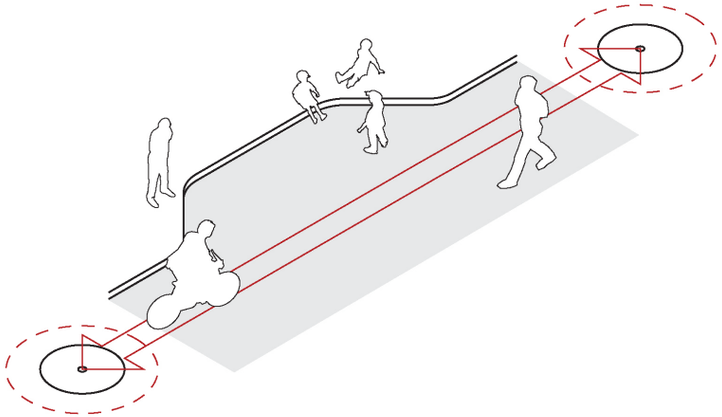
The issues of safety, reliability and accessibility that have plagued Belhar's existing transport system demand strategic and innovative solutions. The design proposal seeks to align transportation with community objectives, recognising the vital role it plays in linking the residents to educational, work and recreational opportunities.

Furthermore, the emphasis on non-motorised motorised means of transport and the reconfiguration of movement routes reflects a deep understanding of the local populace's dependence on affordable and accessible modes of transit. It acknowledges the imperative to create safe streets and vibrant public spaces that encourage pedestrian movement, thereby fostering a more sustainable and human-centric urban environment.

In conclusion, the intersection of public spaces and urban mobility in this dissertation represents a comprehensive approach to community revitalisation. It acknowledges the complex interplay between the physical environment, social cohesion, economic vitality and transportation dynamics. It recognises that the path to a more prosperous and resilient Belhar requires a thoughtful and integrated approach, where design serves not just aesthetic or functional purposes but acts as a catalyst for transformation.

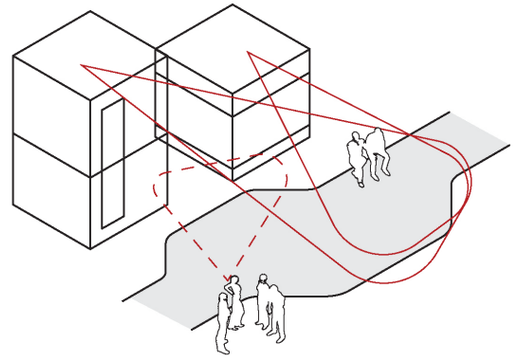
Section 6 I Design Development

Urban Approach & Main Goals



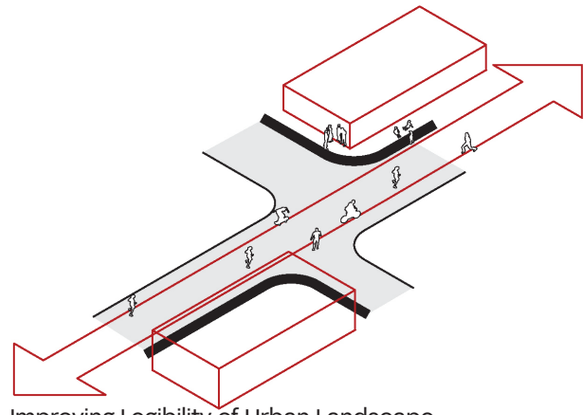
Improving Walkability / Safer Streets

- Enhance Urban Mobility within and around Belhar, focusing on creating efficient, inclusive and sustainable transport networks that promote easy movement for all residents.



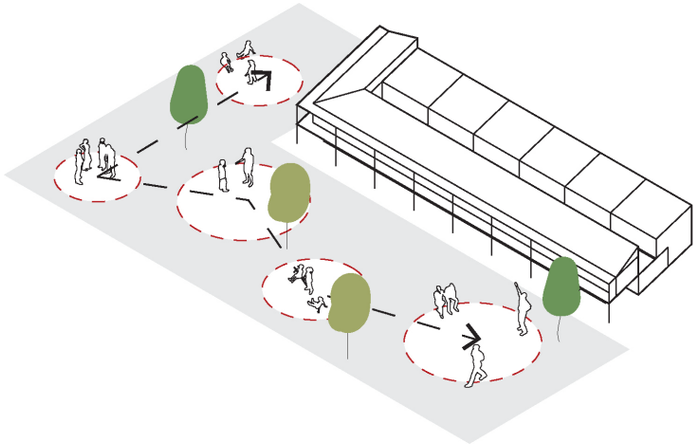
Surveilance / Safer Streets

- Implement effective surveillance within the community to foster a safe environment, deterring criminal activities and create a sense of security among residents.



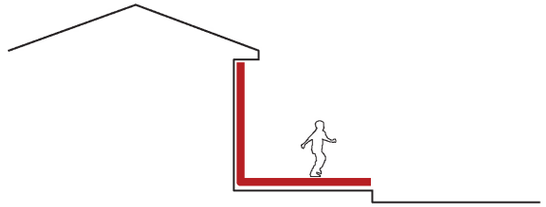
Improving Legibility of Urban Landscape

- Enhance the legibility of the urban landscape through interconnect streets landmarks and nodes.



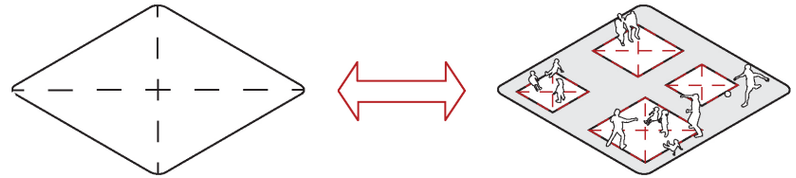
Introducing Civic Life

- Create public spaces where communities can gather, interact and engage with one another.



Activate Street Edges

- Create lively street edges in order to enhance through strategiic interventions.



Activating Vacant Land Parcels

- Revitalise and bring new use to existing vacant and underutilised land parcels.

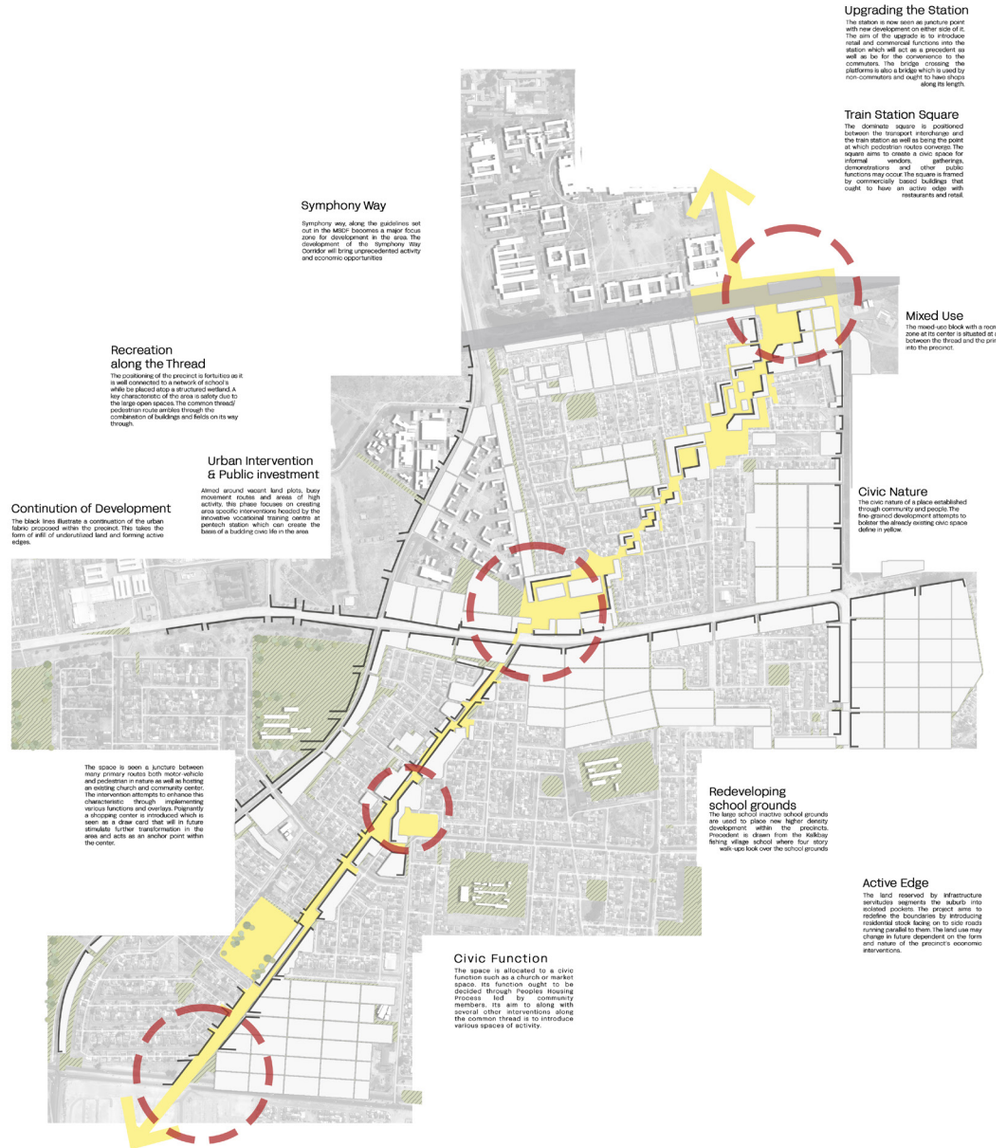
A Civic Thread

The urban intevention (highlighted in yellow) seeks to adress large pockets of vacant land scattered across the Belhar built fabric, areas often associated with safety concerns and limited walkability. To tackle this issue, the project introduces civic functions, which Belhar currently lacks, as a vital component of the intervention stratefy.

At the heart of this revitalisation effort is the transformation of the old cement railway into a dynamic civic spine. This railway, serving as the starting point for the pedestrian movement towards Pentech Station, holds significant potential for improvement. Enhancing commuter safety along the old cement railway is a top priority, given that it's the most frequently used route to the station.

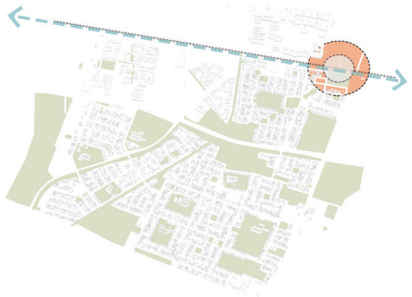
The envisioned civic spine along the railway is designed to do mroe than provide a functional pathway; it aims to create a strong sense of place on the currently vacant land. While it may not be neccessary for individuals to traverse the entire corridor daily, it serves as a crucial point of reference and orientation for residents and users within the Belhar fabric. Moreover, it becomes a hub for place-making, fostering a greater sense of community within the suburb.

Investing in the development of areas like this is essential for boosting investor confidence. Investment in the civic corridor is not envisioned as a final plan of development, but rather forms the foundation for investment in the area: the presence of underdeveloped vacant lands can deter potential investors, making stratefic interventions vital for Belhar's economic growth. Importantly, this corridor alligns with the city's plans for the area (highlighted in grey) ensuring it's synergy with broader development initiatives.



Phased Development

Phased devleopment is a fundamental aspect of this proposal, serving as a critical element in comprehending how the redevelopment of the Pentech Station can act as a catalyst for the future growth of the area. Illustrated through diagrams below , this staged implementation helps in evaluating its feasibility and its capacity to foster growth in the suburb.



Phase 1: Development of Train Station

Phase 2: Introducing Small scale Urban Interventions

Phase 3: Development of Infrastructure along Civic Route

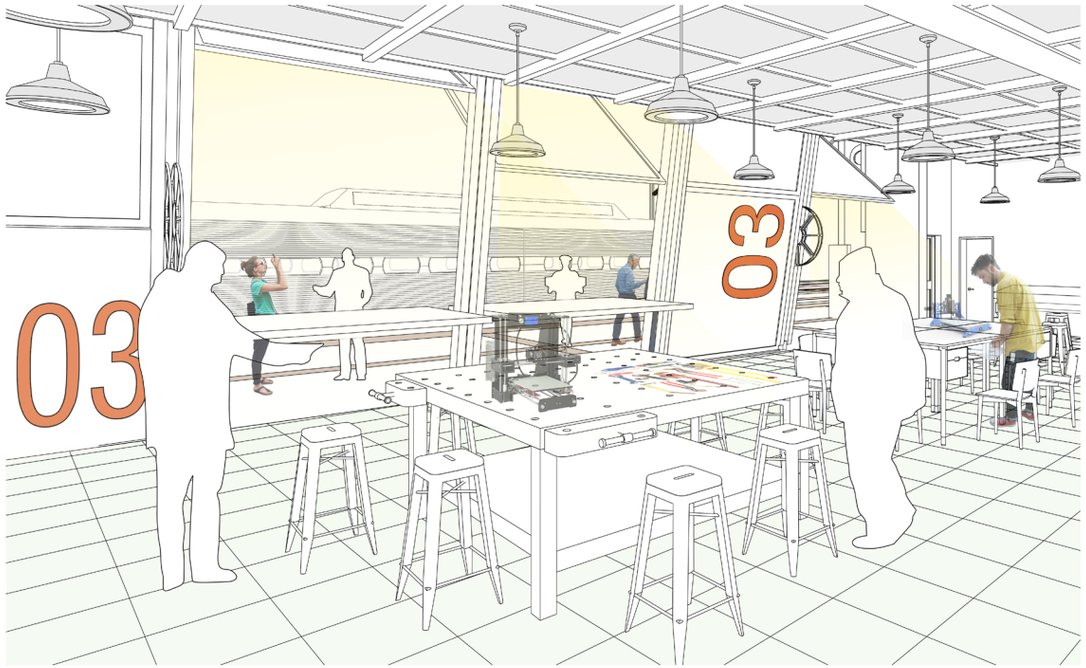
Phase 4: Amalgamation of City's Vision and development of train station

Phase 1: Development of Train Station

This phase primarily centres on establishing the core elements of the scheme. These include the revitalization of the current train station, with a strong emphasis on educational infrastructure, and kickstarting the process of regeneration in the area.

At the heart of the program for the Pentech train station is the creation of a vocational training centre and resource hub. This initiative enables both the community and students to actively engage in improving their urban environment. Here, they produce items that contribute to the betterment of the urban landscape, fostering a sense of ownership and empowerment among residents and participants.

+ Workshop Zone Projection: Interactive Space Layout



+ Pentech Station design proposal

Phase 2: Introducing Small Scale Urban Interventions

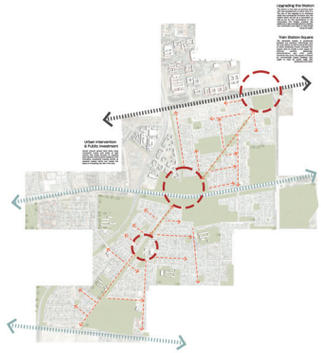
This phase envisions the introduction of small-scale initiatives stemming from the vocational education centre at Pentech Station. The goal is to create tailored interventions and urban furniture that can serve as the foundation of civic life in the area. These initiatives will be strategically placed around vacant plots as place-making initiatives, busy thoroughfares, and for the establishment of community businesses.

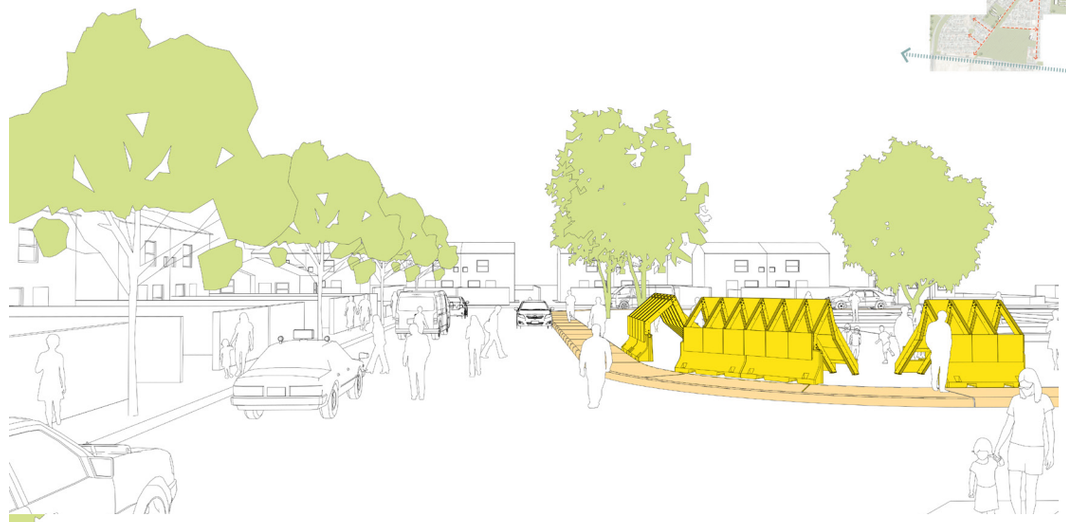
Transitioning towards understanding streets as public spaces is a natural progression. It involves shifting people's perceptions of streets and how they can be used, encouraging active participation in shaping public spaces.

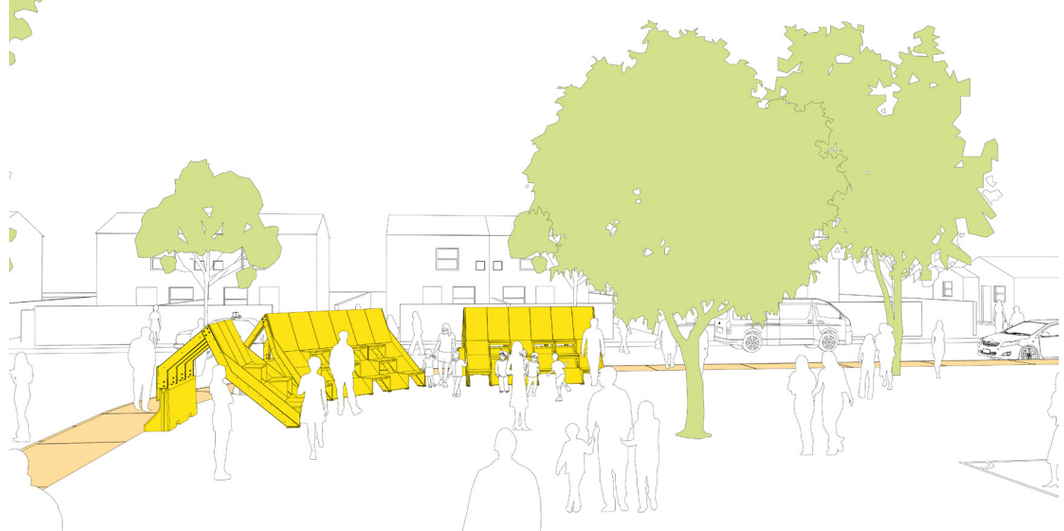
From the informal economy perspective, engaging communities like Belhar in Cape Town is crucial. Empowering these communities to gather information, map their surroundings, collect data and make small changes in their community not only instils hope but also dignity. It's a powerful starting point for driving positive change.

By engaging with users rather than making assumptions about their lifestyles, we can fundamentally change our approach. This phase of public investment could serve as a pivotal indicator in the trajectory of the population and become a trigger for how the city allocates its budget.

By doing so, it empowers individuals to take small but meaningful steps towards influencing and improving their immediate surroundings. Within this context, the project emphasises the interconnectedness of skills and knowledge. It seeks to foster a learning environment where vocational training is a key component. Through these training initiatives, individuals can gain essential skills and knowledge that empower them to contribute positively to the urban environment.





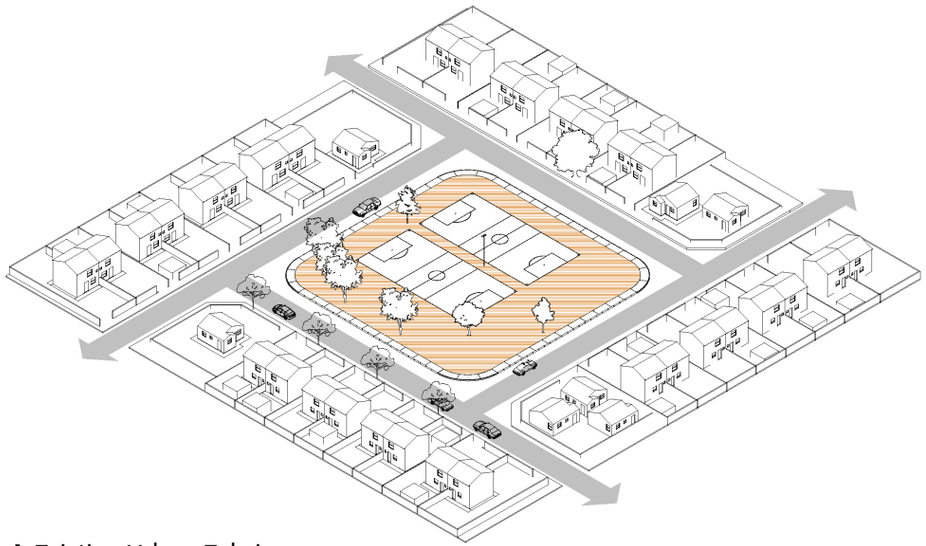


Strategic Placemaking and Public Investment

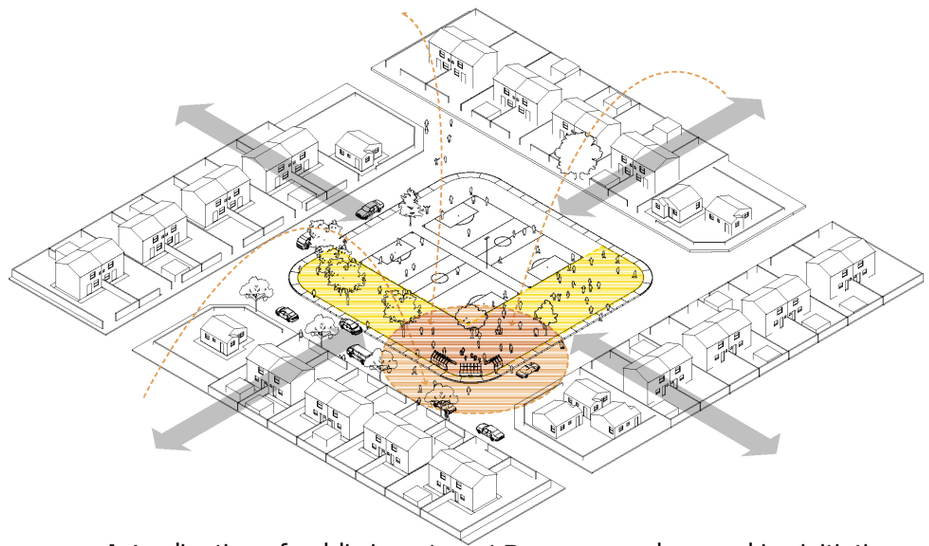
In this project, the interplay between public investment, and resultant private investment holds immense significance. Public investment serves as the foundation, exerting a substantial impact on the project's overall success. This investment is channelled towards essential infrastructure and civic projects. It involves rejuvenating vacant land typologies temporarily to transform them into functional, vibrant and engaging spaces, markets, playgrounds, incubators for businesses, and more.

While private investment may not follow a predicatable timeline or location, public investment plays a pivotal role in sparking investor interest. Public initiatives, like those mentioned earlier, serve as vital indicators of investor interest. When public investment occurs, it acts as precedent, paving the way for an active local economy. This economic activity, driven by both public and private investments, fosters ongoing growth, potential job opportunities and prompting changes in land usage.

In essence, public investment in this project extends beyond conventional infrastructure. It encompasses imaginative placemaking efforts that temporarily breathe life into vacant spaces. This approach lays the groundwork for stimulating investor interest, instigating economic vitality and crafting a vibrant future for the community.



✚ Existing Urban Fabric

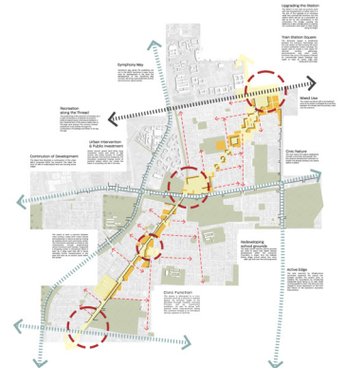


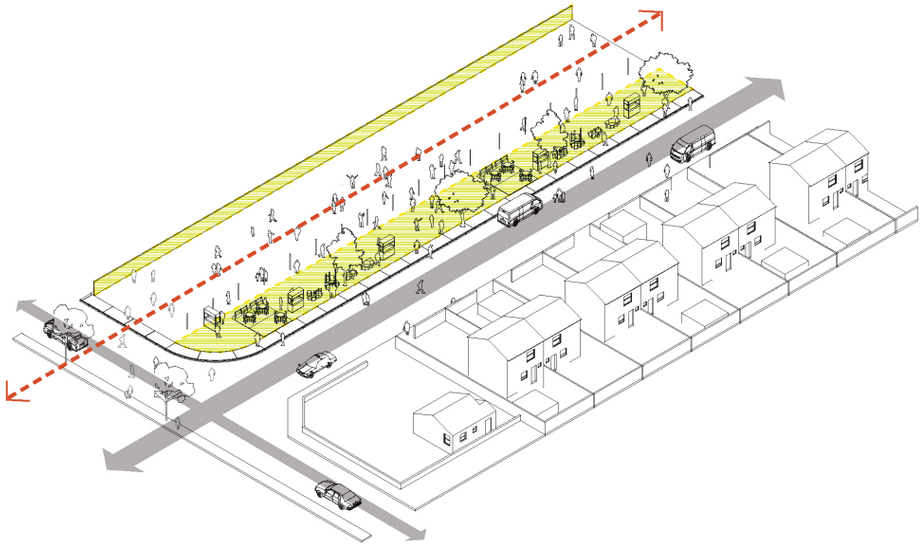
✚ Application of public investment Program as place making initiative

Phase 3: Development of Infrastructure along Civic Route

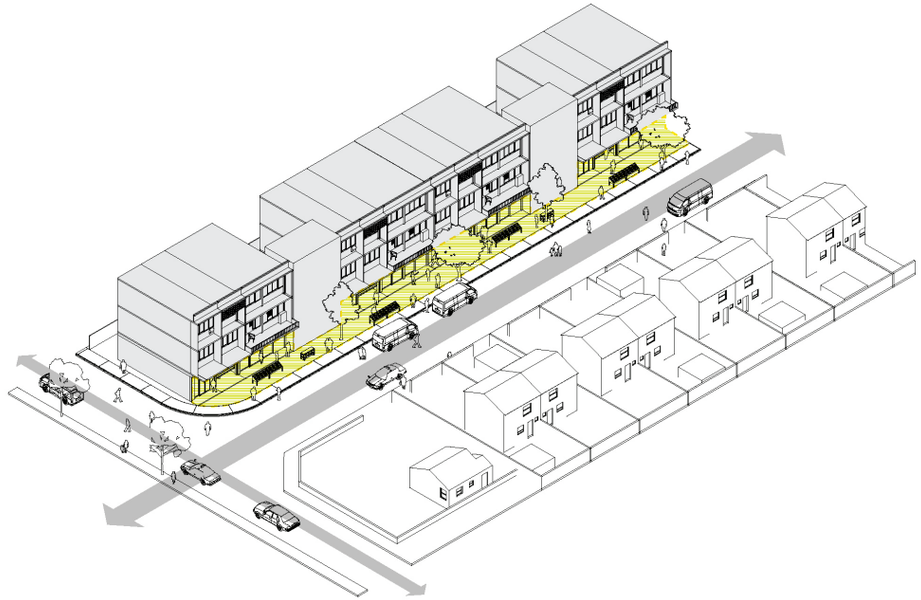
This phase builds on phase 2, developing infrastructure along the civic route, which are supported by the program offered at the Train station. This infrastructure includes mixed use developments and commercial zones etc.

Building on phase 2, you can begin to see the decisions of the residents and understand their choices in a multi-dimensional manner - this will assist in making better choices and providing more suitable solutions to the challenges that they're currently facing.





+ Application of Public Investment Program on existing fabric

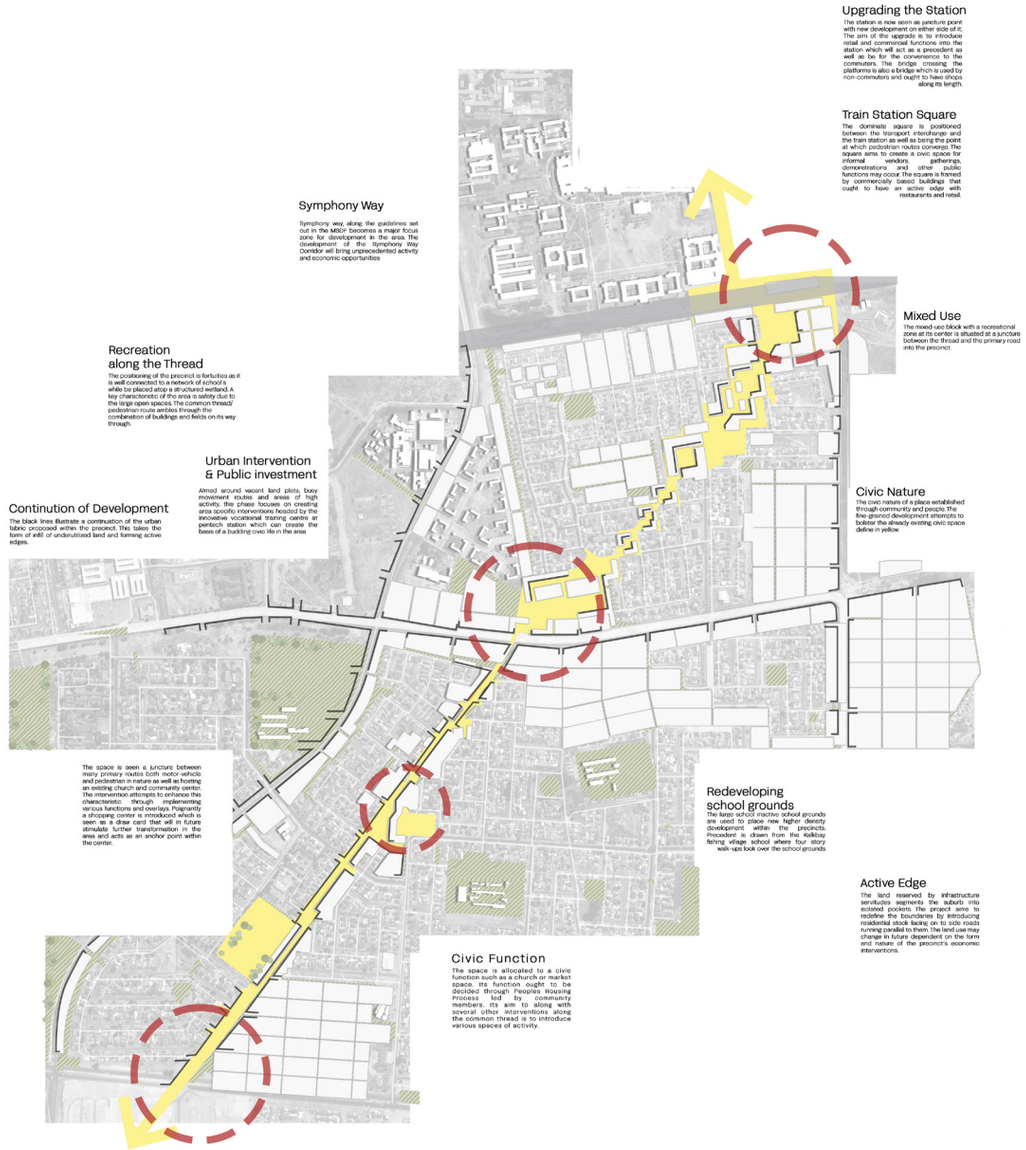


+ Envisioned Future Private Investment derived from public interest

Phase 4: Amalgamation of City's vision & Development of Train Station

This phase is a layered drawing of of the City's vision of the area as proposed in the District Development plans as well CPUT's Masterplan Document. These plans are focused on the development of vacant land, mainly for residential and mixed use purposes.

In the map to the right you can see how the cities developments are focused along major vehicular movement routes, most notably, the Symphony Way Corridor, as well as along Erica Drive, where the city has proposed an Eastward connection to the R300, a major development which will bring new traffic to the area.



Design Brief

Situated at the Pentech Metrorail Station, this design dissertation proposes the establishment of a Resource Centre and Vocational Education and Training Centre, designed to serve as a hub for open source resources for the community of Belhar and built environment students of CPUT. Central to the project is the workshop/fabrication spaces which run parrallel to the functioning of the already existing Train Station and Taxi Drop-off zones.

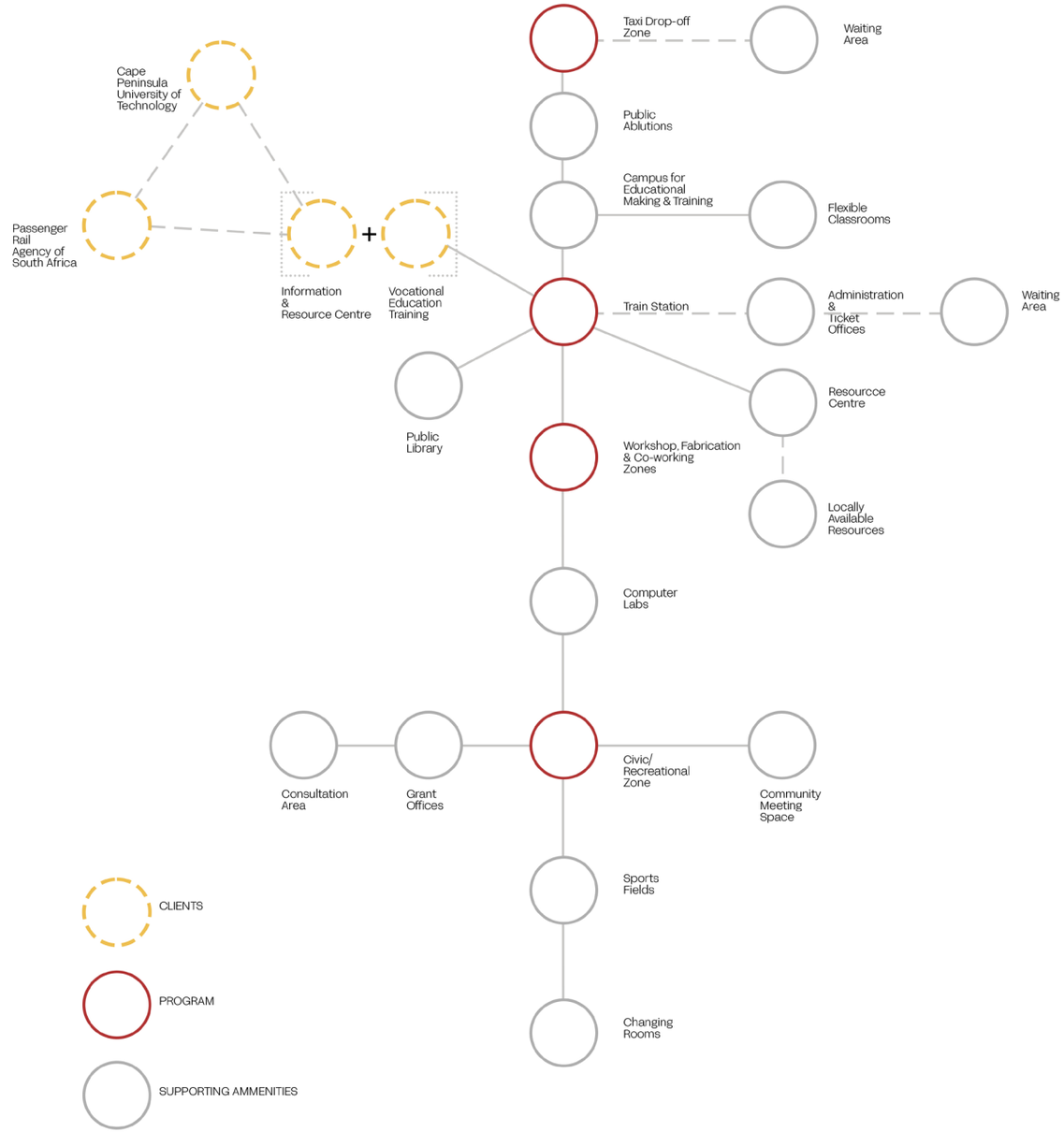
The primary objective of this project is to create a participatory approach that engages both the local community and students in the process of learning and crafting their urban environment. By doing so, it empowers individuals to take small but meaningful steps towards influencing and improving their immediate surroundings.

Within this context, the project emphasises the interconnectedness of skills and knowledge. It seeks to foster a learning environment where vocational training is a key component. Through these training initiatives, individuals can gain essential skills and knowledge that empower them to contribute positively to the urban environment.

Furthermore, the project includes specialised offices, such as grant opffices and consultation offices. which work in conjunction with the vocational centre and play a vital roles in facilitating the granting of building permits and offering guidance on regulatory processes which will be vital for the future development of Belhar.

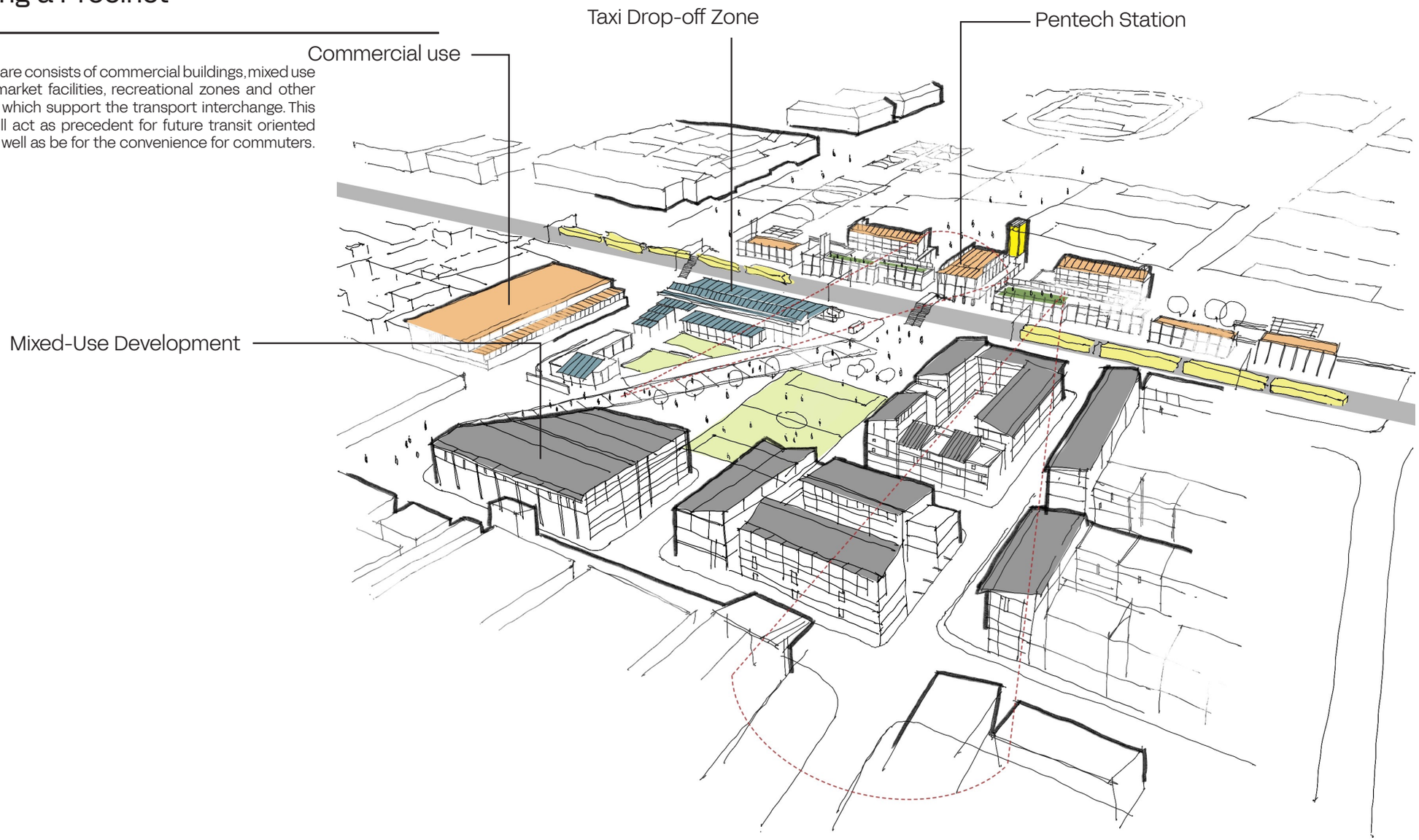
Ultimately, the project envisions itself as a social catalyst operating on an urban scale, promoting community growth and sustainable development through active participating and skill-building.

Program Schematic Diagram



Developing a Precinct

The precinct square consists of commercial buildings, mixed use developments, market facilities, recreational zones and other public functions which support the transport interchange. This active square will act as precedent for future transit oriented development as well as be for the convenience for commuters.



Design Methodology

Movement as an Instigator

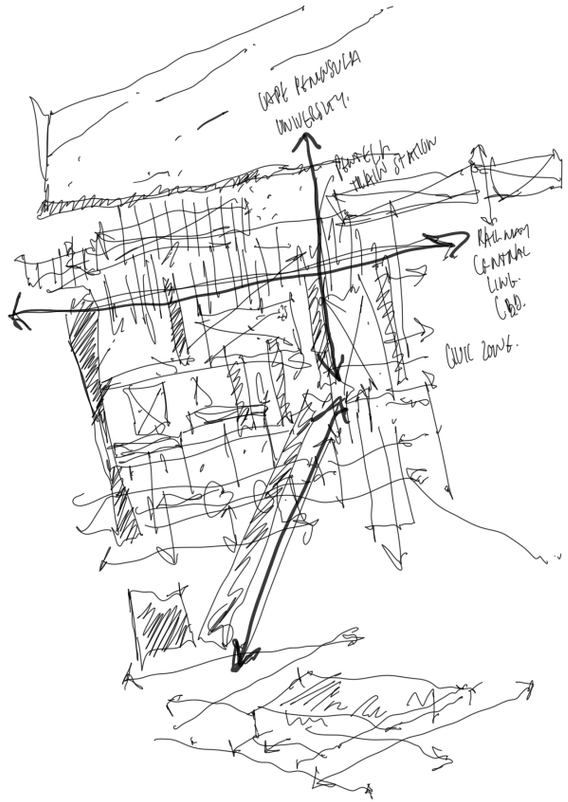
The layout of the plan focused on incorporating the concept of movement as a fundamental design element. Here, movement isn't merely a physical action but also a symbolic representation of the site's component and the activities it hosts.

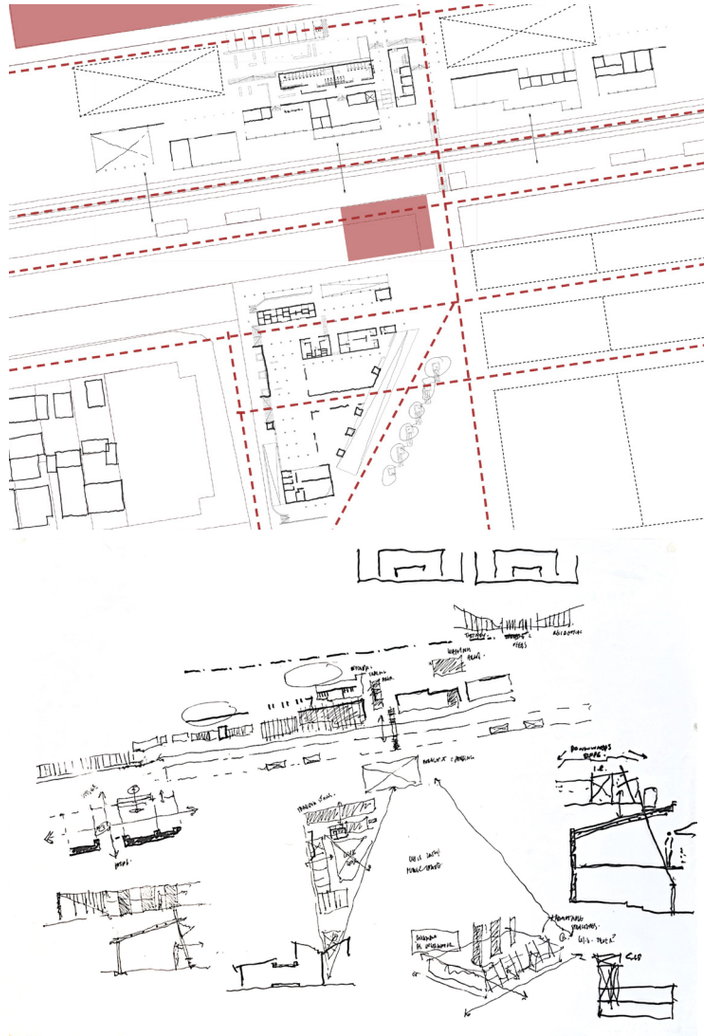
Throughout the design, emphasis is placed on motion, ensuring it's perceptible at every level of user interaction.This approach serves to underscore the significance of the train and the multifaceted functions it embodies.

Merging Space

The design of the project embraces the concept of transitional spaces, which can often be seen as non-places, representing the intervals between one point and another. Just as the train and the site themselves symbolise spaces between other spaces, the design aims to seamlessly merge these transit areas by transforming them into meaningul places.

Drawing inspiration from the idea of being "in-between," the design captures the essence of these non-places and seeks to imbue them with significance. This approach fosters adaptability to the ever-changing demands of the community, particularly in terms of construction applications. The primary circulation routes within the design play a vital role in binding together various aspects of the station, promoting a sense of unity and connection within these transformed spaces.



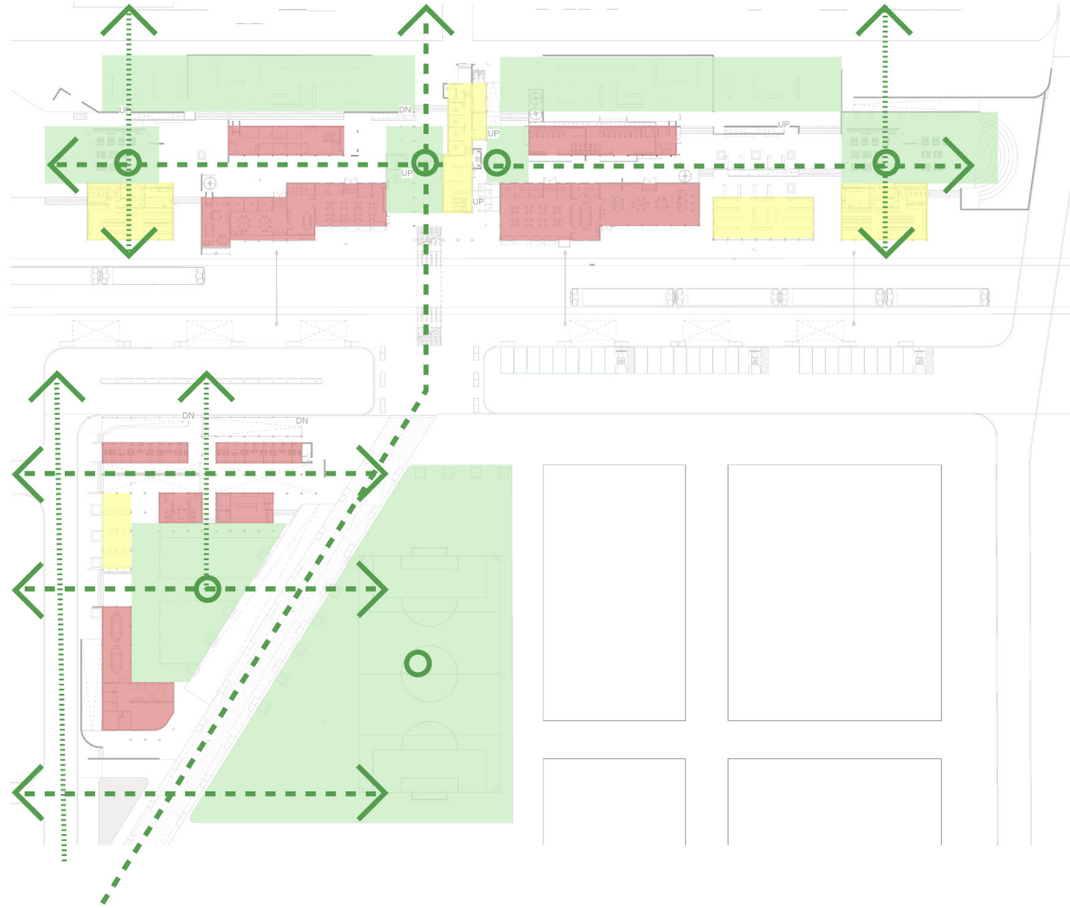


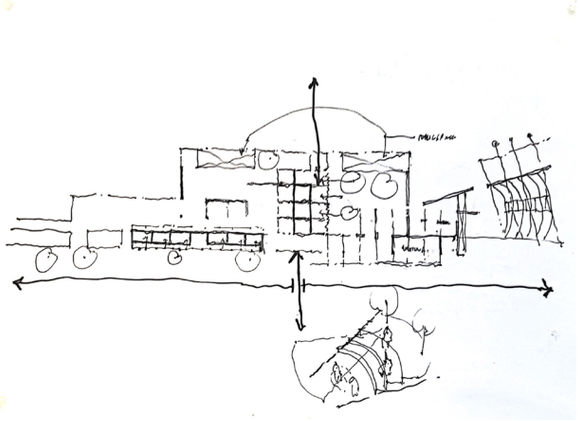
Design Components

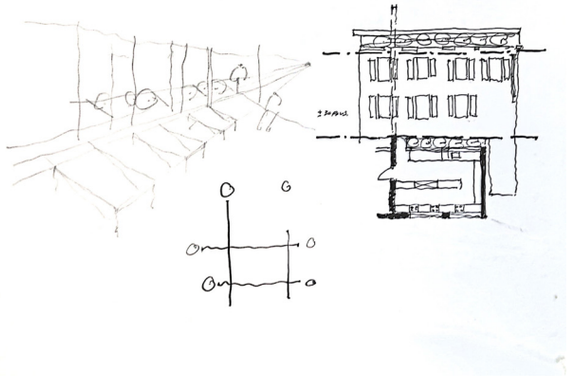
The components relating to the train station and taxi drop-off zone marked in yellow have been fragmented around the site in order for the creation of meaningful public spaces (marked in green) to act as connectors between these elements and instigate the movement through the site. These public spaces have a direct connection with the sports facilities located at CPUT.

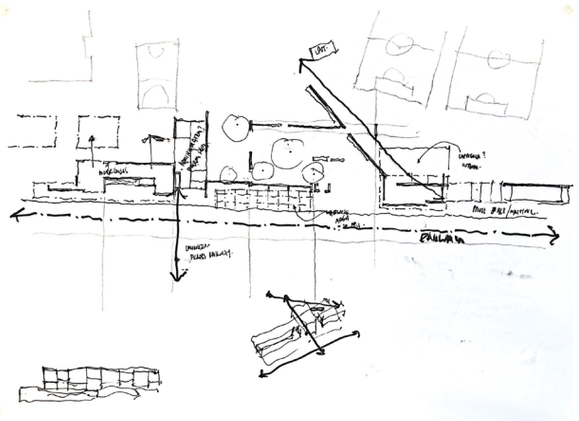
Components marked in red, namely workshop zones, co-working spaces, learning spaces and markets act as mediators between these elements.

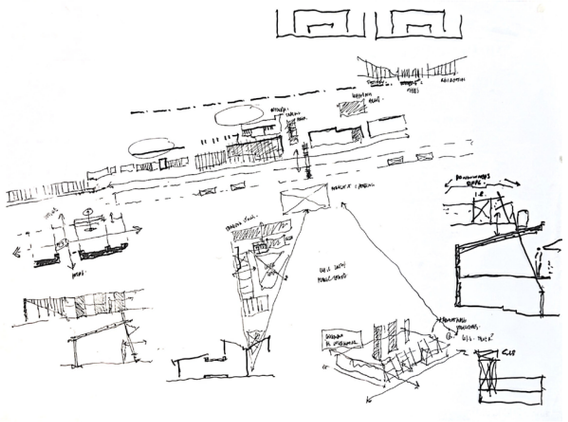
Furthermore, public spaces acting as connectors also serve as welcoming areas where commuters and the public can gather and interact. The goal with these connector spaces is to encourage interactions among different users and foster a stronger sense of community.

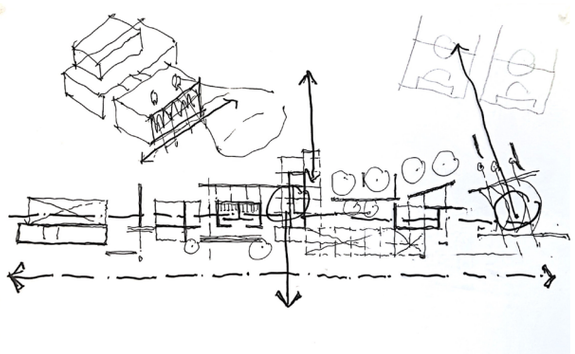


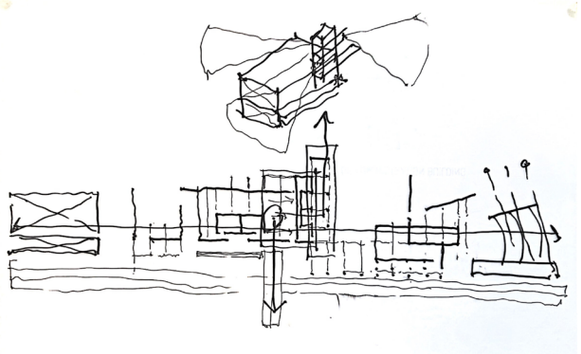


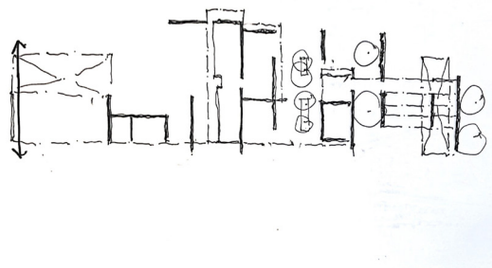


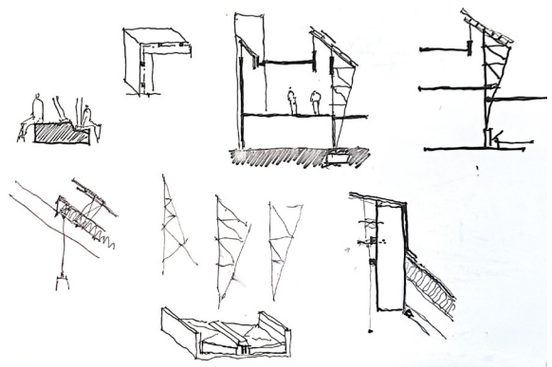












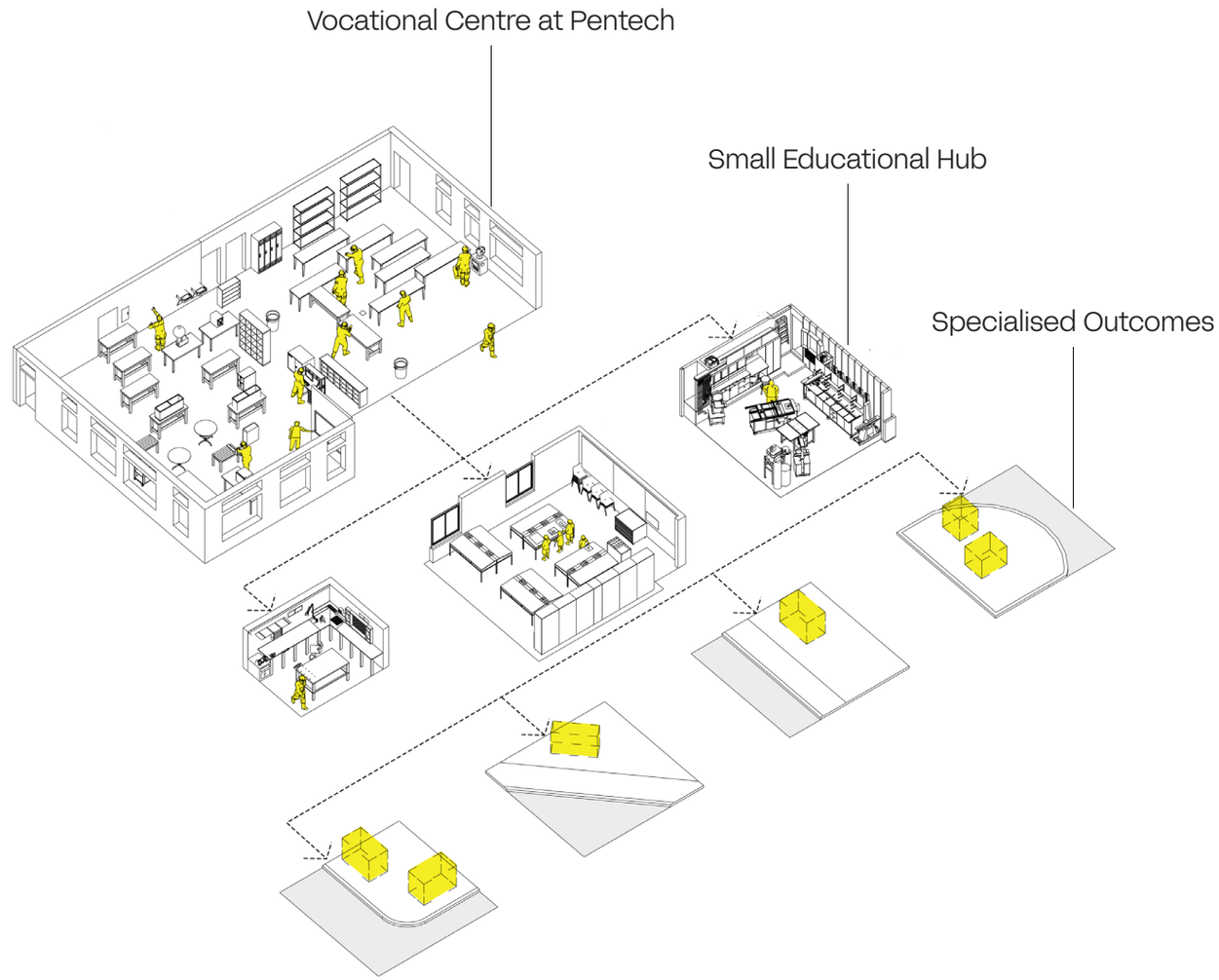
✚ The images above represented a few snapshots of design iterations. Early plan iterations derived the form of the building based on existing movement patterns towards and through the site. Through this exploration a clear pattern of development was derived, one with which the development of meaningful public spaces became vital for its use.

Extention of Program

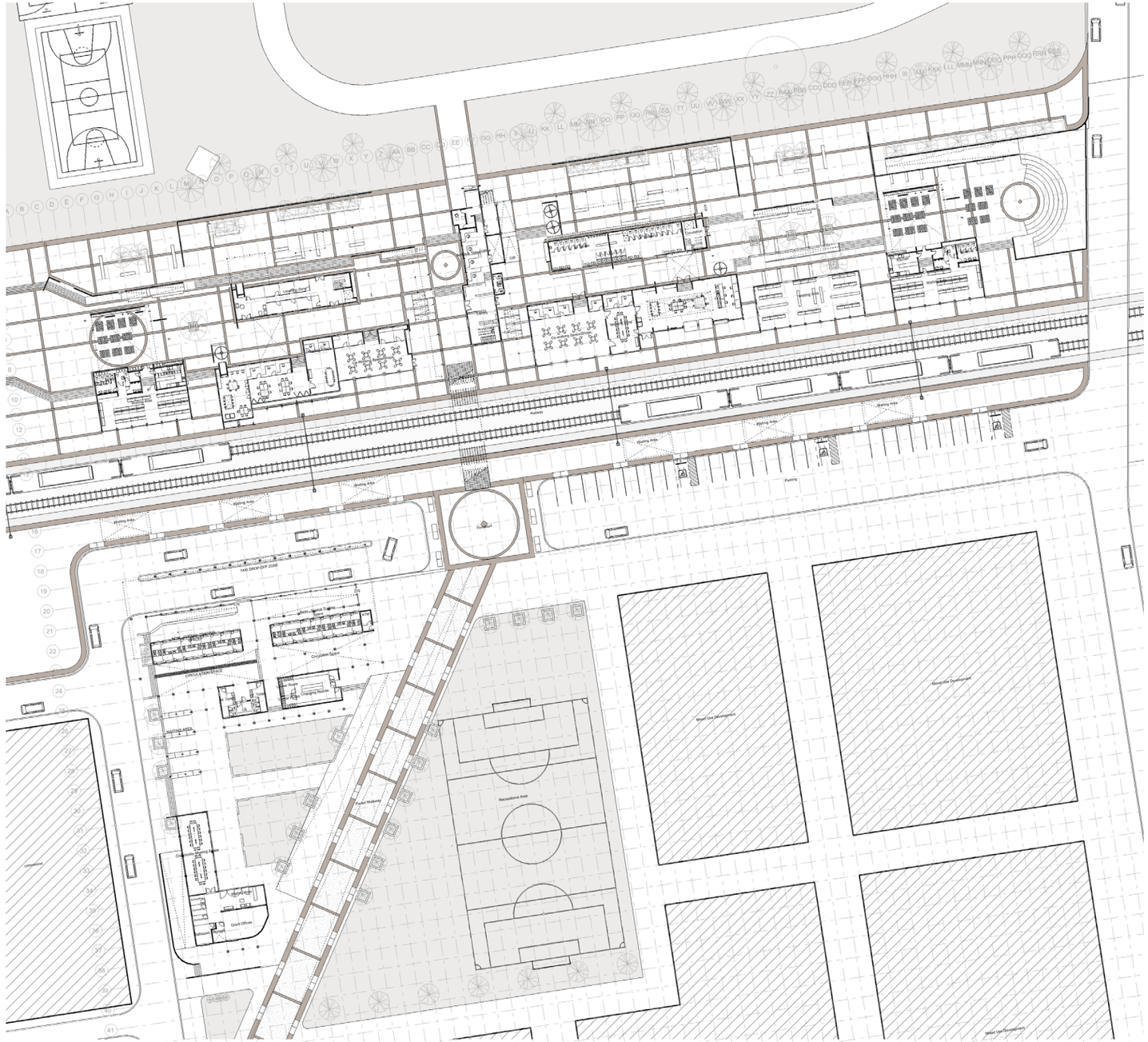
The concept revolves around establishing smaller educational hubs that share the core vales and knowledge of the central educational vocational hub. These areas would take a more nimble approach by focusing on short-term events to disseminate technological education to areas that the main building may not be able to reach. These extentions essentially serve as educational resources, offering workshop spaces, equipment and machinery to areas that might not otherwise have access to these resources.

These hubs would be flexible in terms of their locations, allowing them to reach different areas as needed. They could potentially partner with local schools to provide specialised equipment and educational programs.

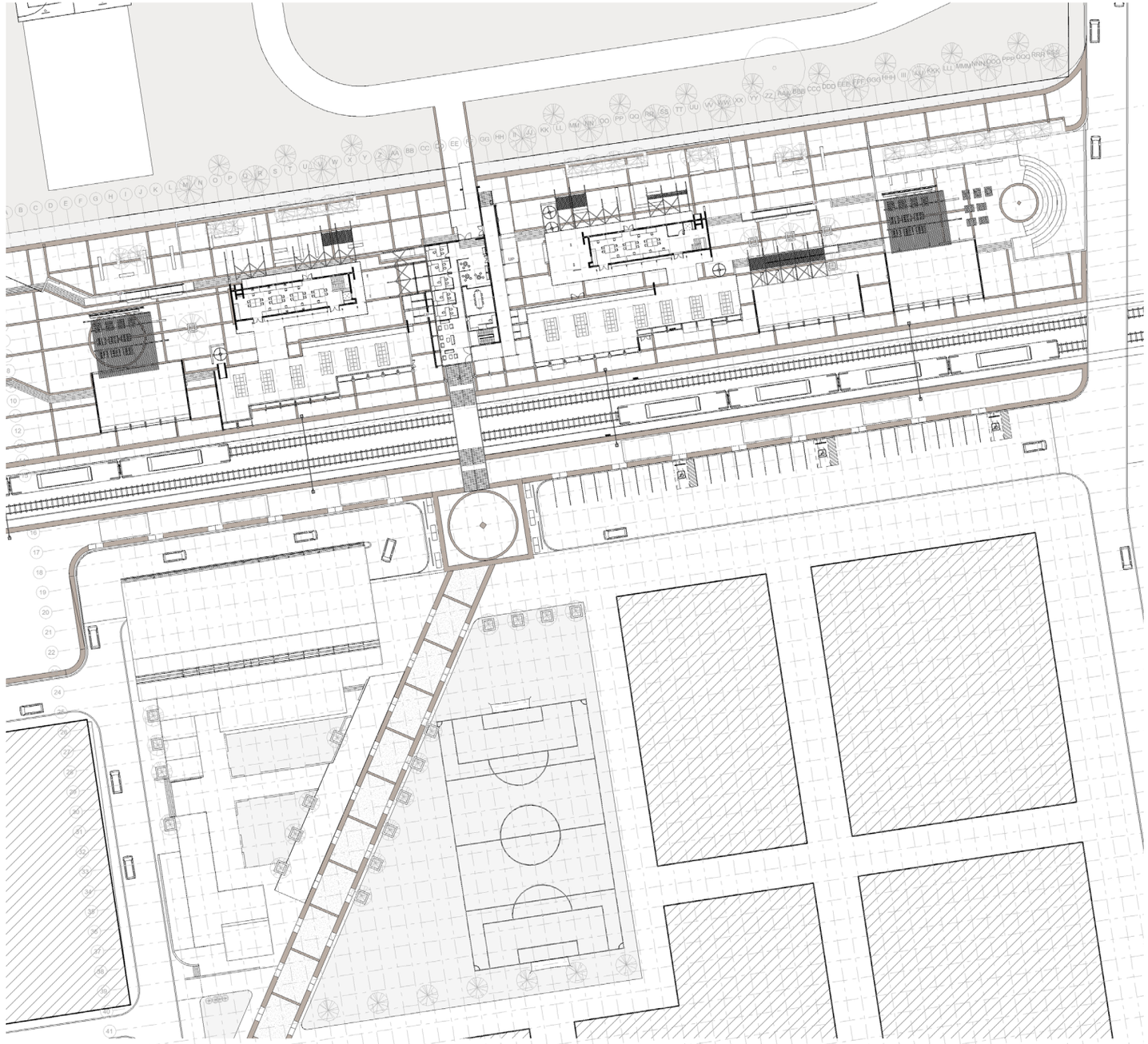
Furthermore, the interconnectedness of these hubs would allow for the exchange of knowledge and experiences. This approoach ensures that valuable skills and knowledge can be shared and accessed wherever they are needed, fostering growth and learning on a broader scale.



+ Ground Floor Plan



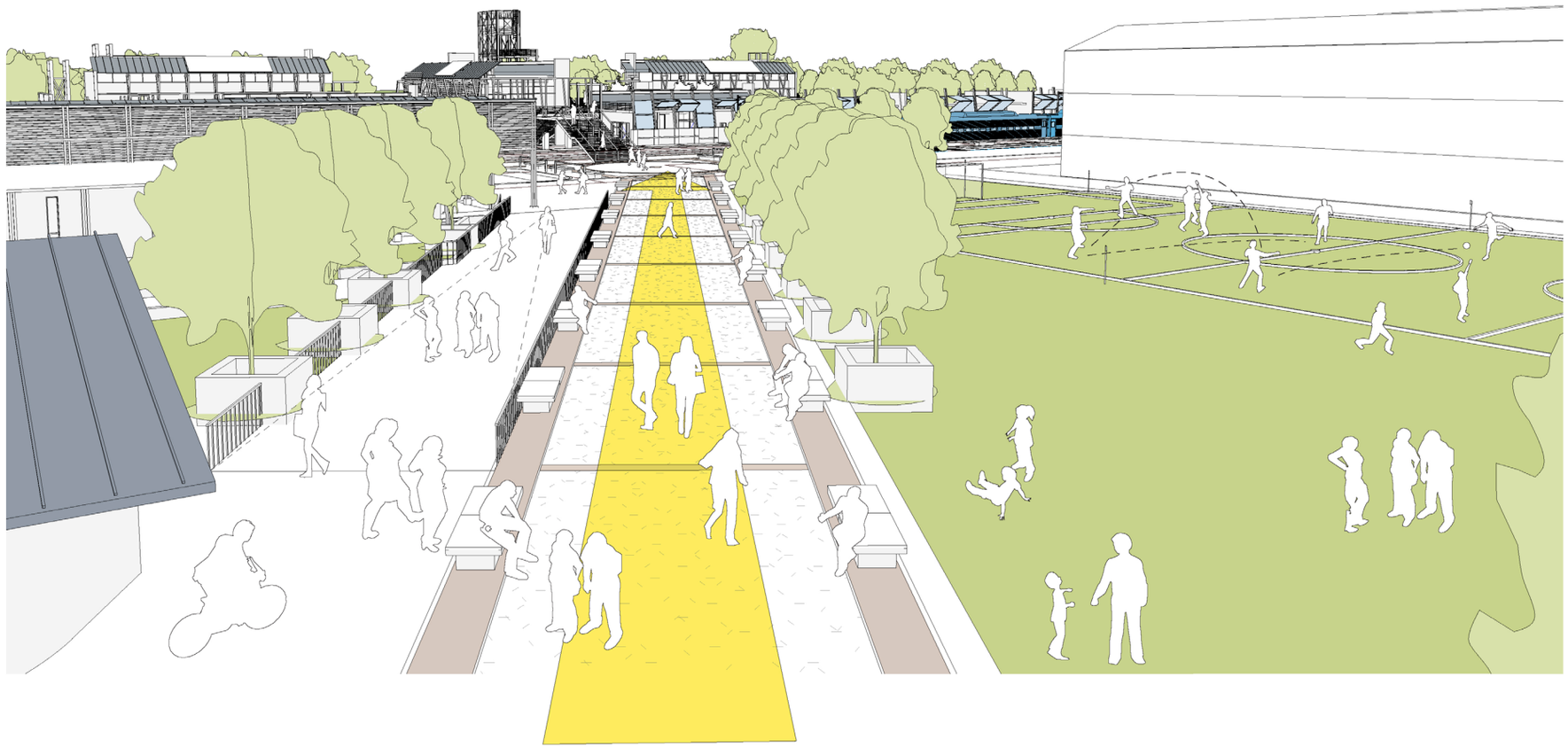
+ First Floor Plan

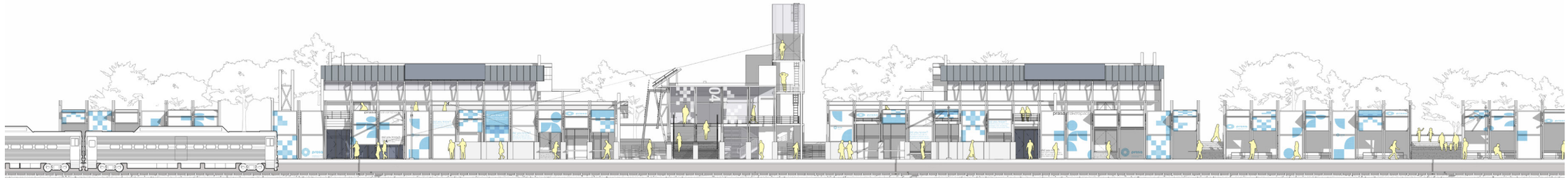


✚ A Safe & Walkable Path towards Pentech Station

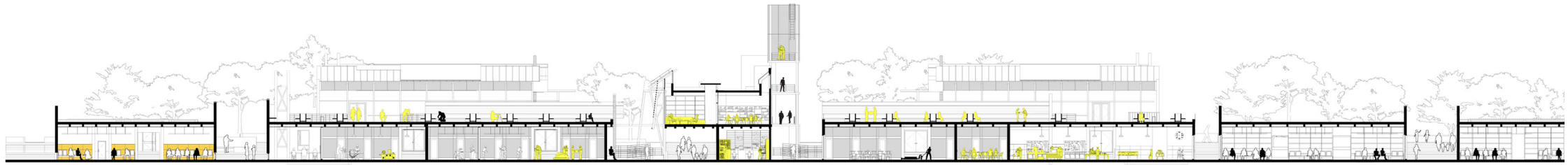
The objective of the design seen below seeks to create a safe and vibrant walking route towards Pentech. Recreational and Mixed-use facilities ensure the prolonged use of the site and as a result aids in safer routes.

The Train station in the distance serves as a landmark building aiding in the orientation of the user towards Pentech.



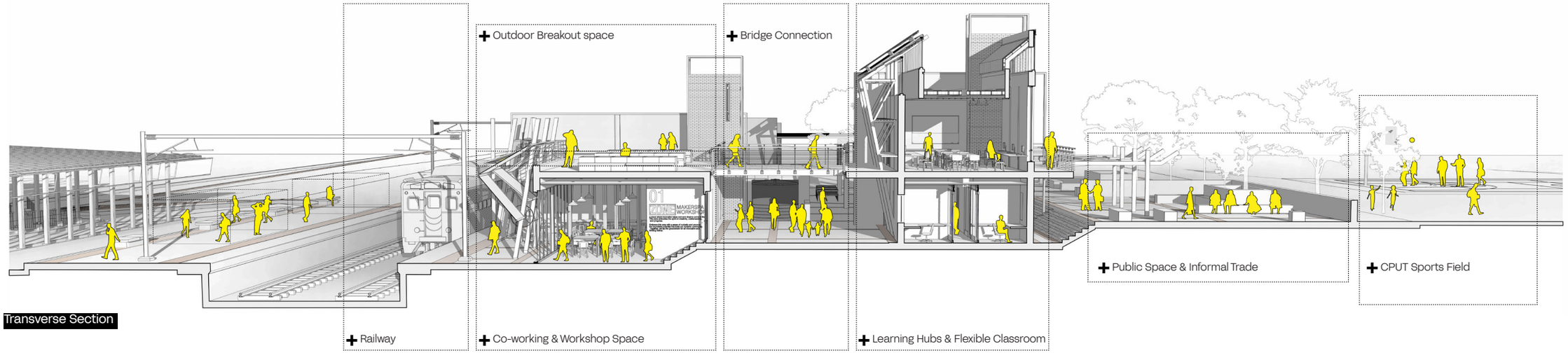


Northern Elevation 1:100



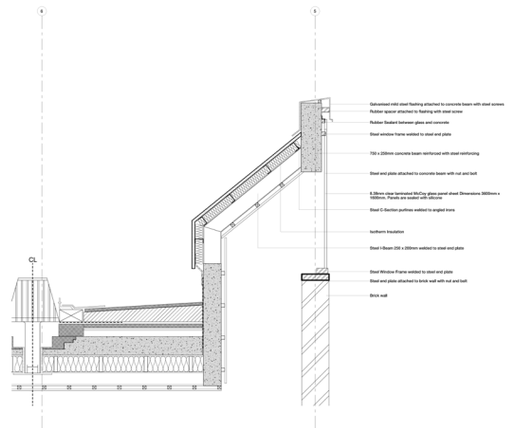
Longitudinal Section 1:100

Transverse Section: Railway - Workshop - Classroom - Public Space

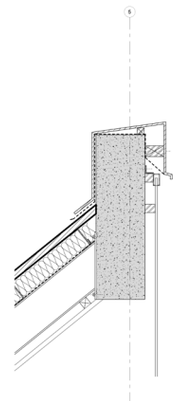


Transverse Section

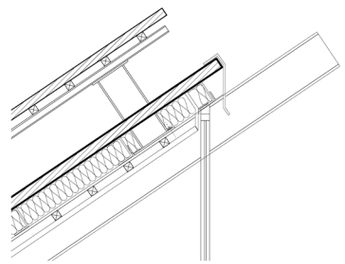
+ The perspective section shows the inner workings of the vocational centre where community members are busy in workshops while commuters on the other side wait for their trains to arrive. Simultaneously students occupy the first floor of the building in classrooms and along the walkable roof, providing passive surveillance on the railway. You also see the roof which softens natural light coming into the area for students who are working on computers and digital software.



Classroom concrete Roof Detail 1:10



Concrete Beam & Roof Detail 1:5



Southern Facade Roof Detail

+ Workshop Space: Interior - Exterior Integration Design

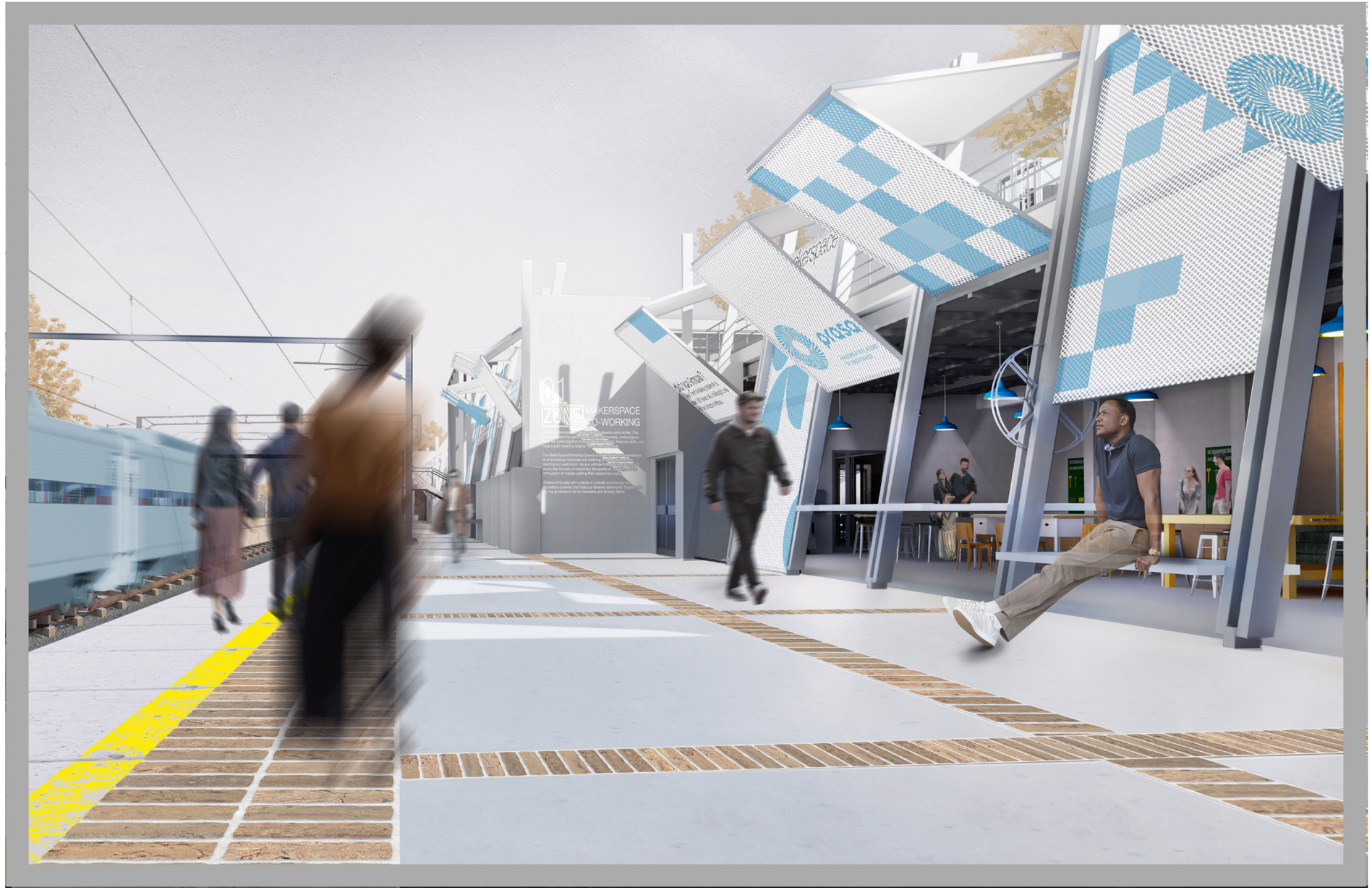
The render shows the relationship between the interior and exterior of the workshop space, where the adaptable facade element allows for controlled lighting and well ventilated spaces as well as the possibility for the space to be completely enclosed to allow for more privacy.

Steel framing and concrete flooring provide a robust environment for materials to be carted around, while the adaptable facade brings warmth into the area.

+ Configurable Interface Design

The facade element is able to be configured either as tables to allow the public to interact and make requests from users within the workshop or as seating for commuters waiting for the train.

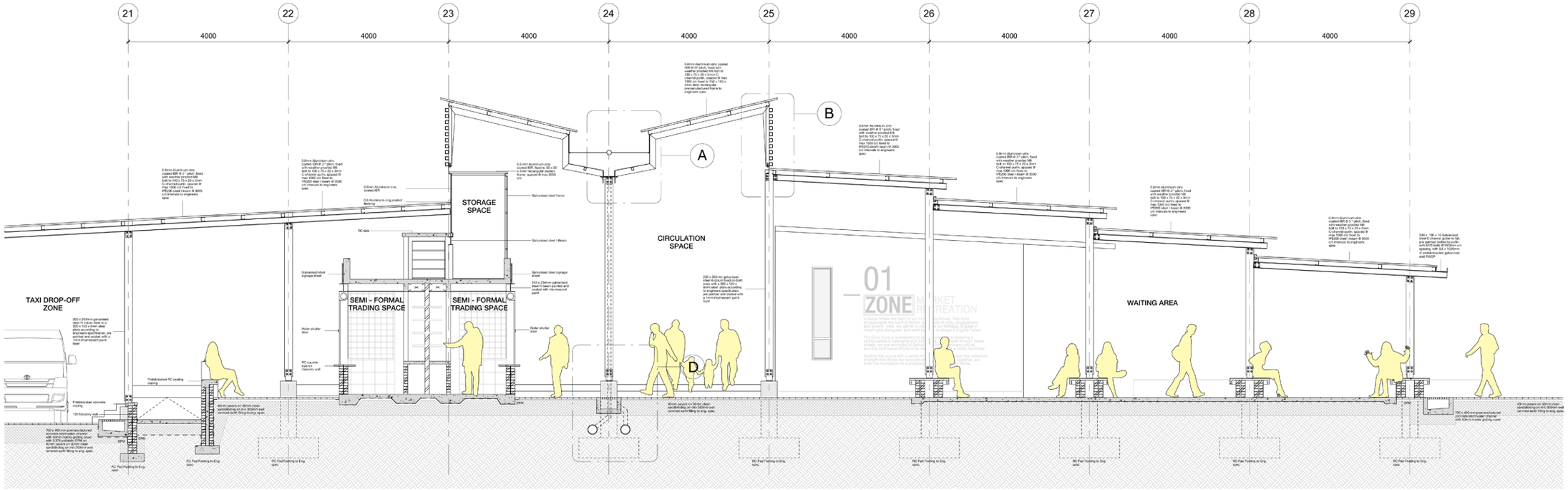
The structure of the building was completed with the use of steel framing and cladded panels that relates back to the railway line. The play with rhythm on the facades, the placing of the water tanks and the use of adaptable panels imitates the idea of movement. The adaptability of the elements in the design, allows for multiple spatial experiences within one place.



+ Ticket Office & Public Thoroughfare

Depicted here is the main thoroughfare which passes through the main admin building. Here students pass through daily in order to get to CPUT while other commuters make a stop at the ticket office before waiting for their train to arrive.

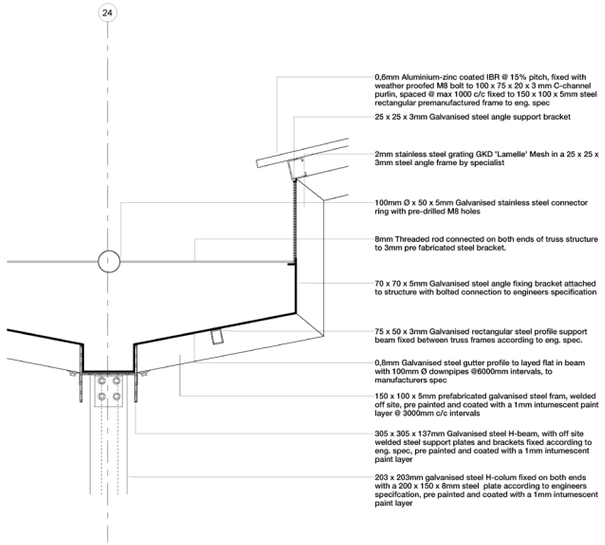
✚Taxi Drop-off & Semi-Formal Market Space

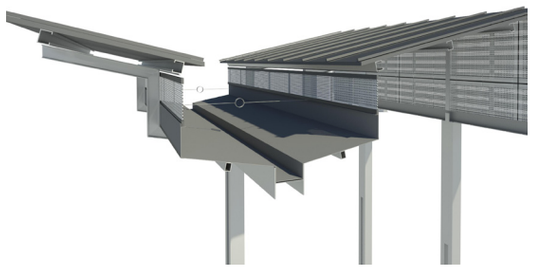


+ Civic Zone & Marketplace Integration

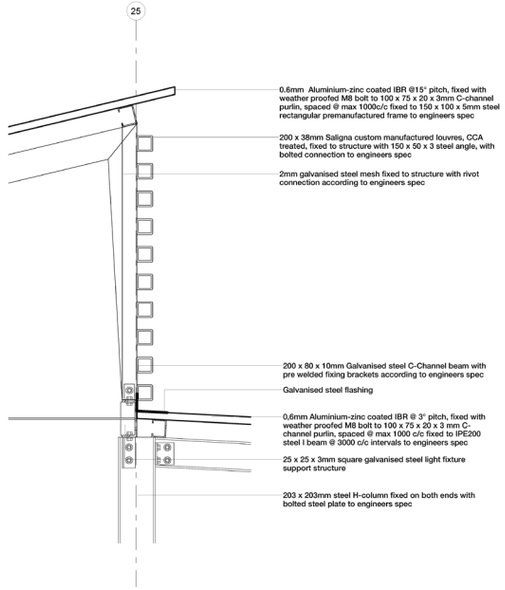
The civic zone illustration depicts commuters returning from the train commute, here they are able to pause along formalized market spaces in order to conveniently purchase essentials before heading home.

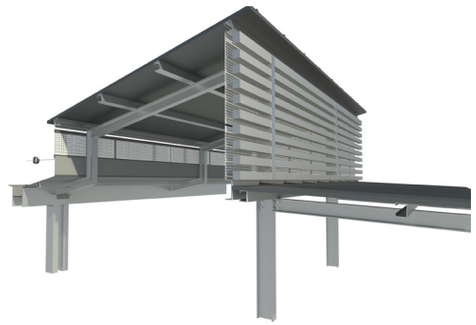
Central Gutter Detail 1:10



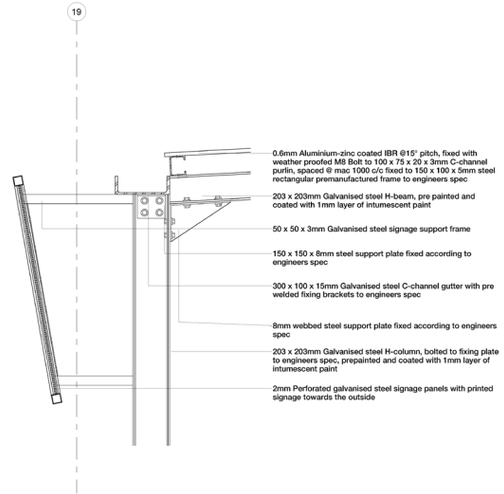


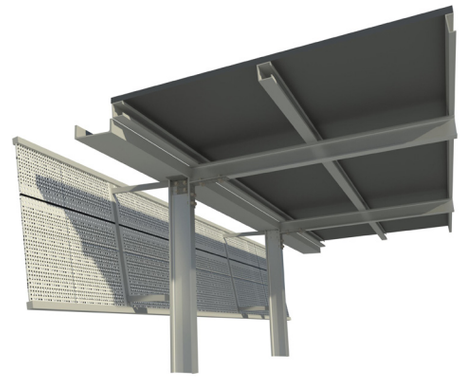
Louvre & Roof Eave Detail 1:10





Side Roof edge Detail 1:10





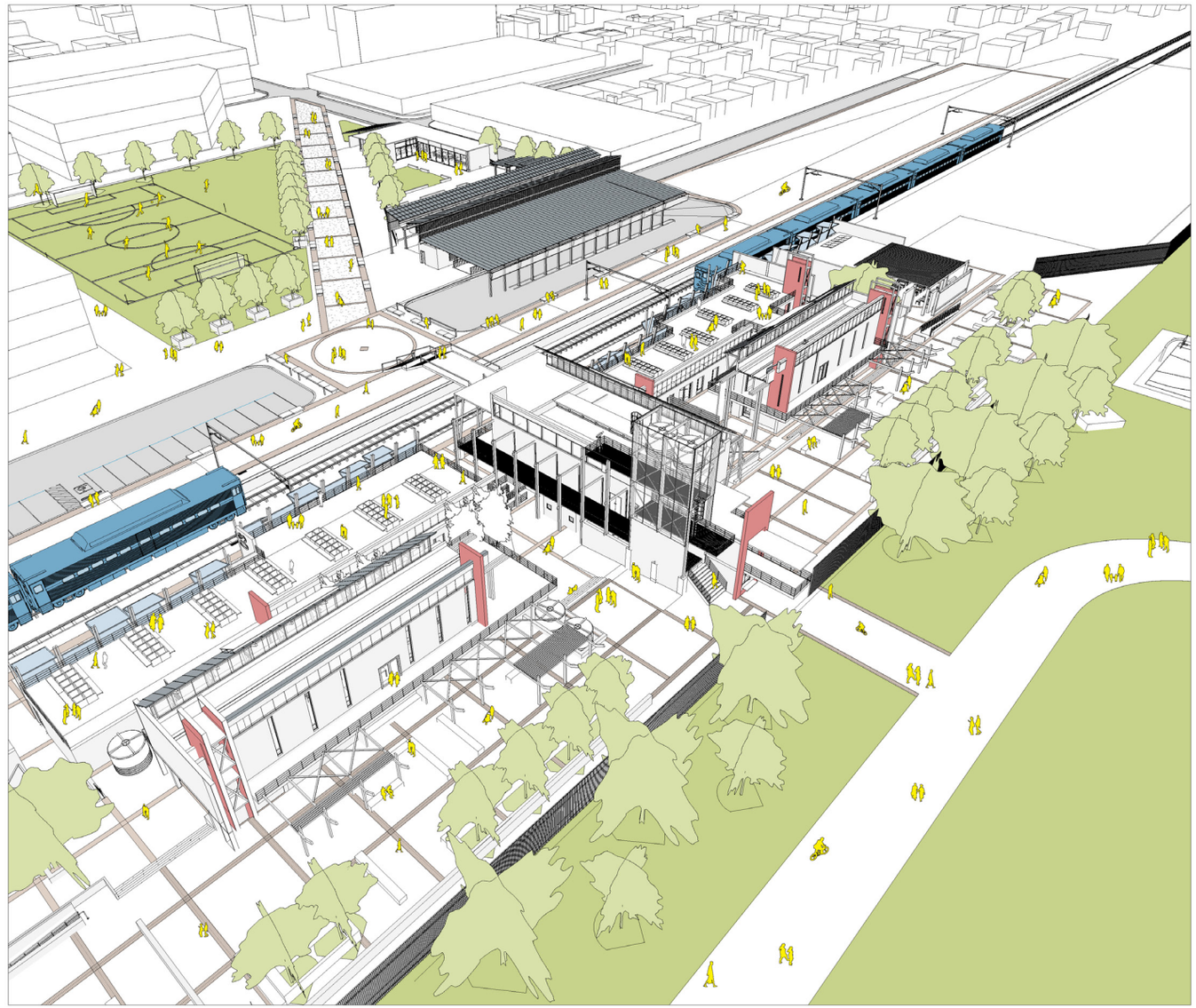
+ Cafe Area Rendering: Spatial Experience Concept

Cafe areas sit adjacent to each designated waiting area in order to ensure the prolonged use of these areas in order to provide safer waiting areas. Here users and students would be motivated to spend time which in turn would create safer environments for commuters.

+ Open Air Assembly Spatial Concept

The open air assembly extends from the cafe area and also has a direct relationship with the sports fields at CPUT

+ The overall scheme aims to create a landmark in the urban fabric of Belhar. Similarly the terraced typology aims to allow views onto the main movement route towards Pentech in order to create overall safer spaces.



+ Site Overview - Enhancing surveilance and Security along pedestrian pathways

✚ Elevated Site Perspective

✚ Aerial Perspective - View from Observation & Geomatics Research tower Tower

✚ Street-Level Perspective - Civic Zone & Taxi Drop-off

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

PRE-SCREENING QUESTIONNAIRE OUTCOME LETTER

STU-EBE-2023-PSQ000664

2023/09/14

Dear Saliegh Davis,

Your Ethics pre-screening questionnaire (PSQ) has been evaluated by your departmental ethics representative. Based on the information supplied in your PSQ, it has been determined that you do not need to make a full ethics application for the research project in question.

You may proceed with your research project titled:

MOVING MINDSETS: A MULTIDIMENSIONAL INQUIRY INTO URBAN JUSTICE THROUGH THE LENS OF URBAN MOBILITY AND THE EVOLUTION OF PUBLIC SPACE

Please note that should aspect(s) of your current project change, you should submit a new PSQ in order to determine whether the changed aspects increase the ethical risks of your project. It may be the case that project changes could require a full ethics application and review process.

Regards,

Faculty Research Ethics Committee

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