

DISSERTATION TITLE: (Re)-Programming Typologies of Public Infrastructure to serve as a Tool for Cultural Evolution

A Re-imagination of the Cape Town Station

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ABSTRACT

This design dissertation aims to explore the Cape Town Station as an opportunity to support the social evolution that is on our doorstep. For this I chose to explore the balances in the concepts of culture, society and identity; and consequently the ideas of typology and programming within the infrastructure of a major railway station/public transport node.

Individual and social identity is an omnipresent topic in the architectural discourse. Countless theories exist that attempt to understand the composition of identity; the lack thereof; the origin; the contestation and the evolution of what makes us US: a unique and conscious being that belongs.

Navigating this vast topic of architecture + identity is not an easy task, and it is easy to attach to existing discourse within the larger field of discussion of aesthetic and imageability. This dissertation therefore will approach the problem from a completely different angle, and will use the issue of identity in a post-apartheid South Africa as a basis to explore method of design that is appropriate for the Post-Apartheid context in South Africa.

(See fig. 01) This is an aerial view of the Cape Town station and its immediate surroundings. The station has been cropped out and a toy has been put in its place.

The toy is an educational toy which is supposed to symbolise a vessel. The simple objective of this educational toy is to take differently shaped and differently coloured objects and find the appropriate opening for the object to pass through into the centre of the vessel. The objects (recognisable/ identifiable) now coexist inside the vessel.

This vessel symbolises an ideal public space which has been programmed to create the conditions so that each entity of our society can find its place, and through that can coexist inside the public space.

With this at its premise, this dissertation first vigorously analyses



fig.01 - Abstract image - *The Cape Town Station as a vessel for the evolution of culture in a fragmented society. (author)*

concepts of identity, as well as methods of design in terms of Typology and Programming. Secondly it synthesises principles from within these to establish a more appropriate method of design to re-imagine the Cape Town Station (a typology in its sense) into this kind of public space, a space of egalitarian coexistence and understanding.

PREFACE

My interest in the relationship between Architecture and Identity, and our fragmented society comes from an experience three years ago:

One afternoon I was on the MyCity bus which I used daily to commute to and from work. I spent the time on these trips observing the people and wondering where they were from, what their lives were like and what they were saying or thinking.

The mix of people on the MyCity route to and from Salt River was almost a true cross-section of Cape Town's people. One could hear all kind of languages and stories from a variety of demographics.

However one day it struck me how isolated I felt amongst this colorful display of life on a bus. Most of the time I did not understand the language that was spoken in conversations. I did not know where the people came from or where they were going. I had no idea what their stories were about. And thus, I had no idea what their Identities comprised of.

This revelation frustrated me. And I started wondering what I could do, personally and within the influence of my profession, to engage with this issue of complete isolation amongst the fragments of our society.

Perhaps spending a lot of time in a bus with a lot of people whom I could not understand was the experience I needed to shift my mind to a place where I could no longer imagine myself living in a world disconnected from everyone around me.

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INTRODUCTION

More than 20 years have passed since the end of apartheid in South Africa and the birth of the South African democracy. Yet the country is still facing the immense struggle of undoing the legacies that have been left behind by the designed segregation in terms of social/racial structures and spatial planning from the era of the nationalist rule.

Apart from the on-going struggle for equality and equal opportunity for all citizens of the country, there is another issue that people have - perhaps only until recently - not consciously dealt with: **the struggle to identify oneself in space and time (and as a collective)** has become a focus in recent period. This is evident in the rise of movements such as *#RhodesMustFall* which started on the 09 March in 2015 (fig.02), where students from the University of Cape Town challenged the issue (*amongst many other issues such as institutional racism*) of the inability to identify themselves with their educational institution.

This movement illustrates the gap between the identity of individuals - and their collective - and the space they inhabit, together and alone. It is said that this issue persists because partly the spaces that already exist, as well as new spaces that are being created in South Africa do not successfully reflect/ embody/address the identity of South Africans today.

This is one of the main reasons why the profession of architecture has made it its task to address the topic of social representation within architecture, even dealing with questions revolving around a new aesthetic for the African context. This paper will not attempt to participate in these endeavours.

Instead it will propose a different approach to the issue of identity in Post-Apartheid South Africa by putting at its premise the question of whether a collective identity even exists for it to be expressed by spaces and places. By asking this question, the notion of whether architecture can be a tool used to facilitate an **evolution of a collective identity** comes to light. Removing architecture from the position as a simple respondent to identity (*because, is there one?*) and placing it in the position of being the catalyst that evolves aspects of coexistence and understanding (fig.03).



Zooming into this rather large proposition one can now ask a more precise architectural question that assesses method of space making in South Africa. By picking the arguably two most opposing methods, namely *Typology* and *Programming*, this paper will attempt to synthesise, through dialectic, **which of these methods, or perhaps even a hybrid of both, should be the contemporary approach for progressive space/place-making in a post-apartheid South Africa.**

fig.02 - 09 April 2015: the removal of C.J. Rhodes statue on UCT campus. (source: the sunday mail. Image by: Schalk van Zuydam)

Through the results of the theoretical exploration, these found principals can be tested by applying them to a public space. Challenging typology through programming will take place by finding a suitable project that offers itself for re-imagination with the ambition of creating public space that accommodates all forms of identities, exposes them to each other, and facilitates an exchange, and with that an evolution of culture.

fig.03 - diagram: *architecture + identity*. (Author)



OUTLINE

In order to have a systematic clarity, this dissertation will first establish itself firmly within the concept of *identity* and its relationship with the (built) environment by exploring works of theory that have dealt with this topic. This will be followed by an illustration of the post-apartheid context in South Africa.

Following this, an in-depth exploration is done of the two chosen methods of space/place making: *Typology* as well as *Programming*. Theorists will be referenced where proper. This will allow this paper to assess these two methods with efficient rigour when proceeding to the final part of the paper:

As a critical process, this paper will superimpose the theories of origin/composition/evolution of individual/collective identity, through the local context, onto the two methods of design and will attempt to synthesise progressive theories for contemporary public space/place making in South Africa.

This is then followed by the narration for the choice of the Cape Town Railway Station as a testing ground. This will also require a historic analysis of the station as well as its typological characteristics and statistical information. This will form the basis from which the programmatic design process will begin with the aim of re-imagining the station as a public space which allows for cultural evolution.



PART

ONE

CONCEPTS OF IDENTITY and Architecture

In order to be able to address the issues of identity and architecture in South Africa today, as put out by this dissertation, it is important to understand all elements of identity itself.

The general discourse about identity in architecture originates in the ambitions of the movement of Critical Regionalism. Architectural theorists I. Lefaivre and A. Tzonis co-authored the book *Critical Regionalism, Architecture and Identity in a Globalised World* (2003) in which they discuss critical regionalism as the new movement in architecture; the design of/for identity. As background the essays trace the origin of critical regionalism as emerging out of regionalism as well as the international style, which both were direct post-modern responses to the modernist movement. In this book Tzonis reasons that it had become increasingly urgent for this evolution because *'the unanticipated impact of globalism showed that if it were left unchecked, it would be economically costly, ecologically distractive, and calamitous to human society'*. (Tzonis, 2010:6) (fig.04)

This statement illustrates the realisation that the focus on identity within the work of our profession had become increasingly important. Therefore it became clear that the architecture of Critical Regionalists should pay close attention to the particular; it expresses aspects such as origin and history, and puts the understanding of the *genius loci* at its centre.

Tzonis focuses on the two aspects of *genius of place (loci)* and *regions in memory*; both being strong ideals of critical regionalism. Genius Loci goes beyond the physical constraints of geographic location and references the identity of a space in the form of emotional, social and cultural aspects. Memory specifically deals with the power of architecture to evoke a sense of self and collective within public. This idea of place as both a geographical location as well as an emotional construct made up of experiences and memories in people's lives is echoed by K. Wm Heath in *Vernacular Architecture and Regional Design* (2009).

Heath's definition can apply to an individual for example with childhood

opposite page: fig.04 - Globalisation: Dubai, a globalised city in the desert. (source: hdw.eweb4.com. Image by: unknown)



fig.05 - Events that shape a collective memory: Japan tsunami 2011 (source: newsfirst. Image by: unknown)



fig.06 - Events that shape a collective memory: Prison release of Nelson Mandela (source: Getty Images. Image by: Allan Tannenbaum)

memories etc., as well as to a collective memory of a society where a large group of people share the same experience such as a natural disaster (fig.05). So in that case all of those people share the same memory and thus have a collective historical identity in that aspect (fig.06). A collective identity exists where human emotions overlap with one another. Important to note here is that these are regions in memory at different scales. It is suggested that within each person reside multiple states of identity. One could say that it is made up of layers.

To explain this one might consider a country of football fans. Within this country there are several football clubs, competing against each other in a national league. Football fans support their specific club and this creates a large variety of identities in this large crowd of people. Now we consider this same country of football fans, this country is now participating in an international football tournament with a national team. In this context, the entire country is united in their identity with their team. So first and foremost everyone shares the identity of the national team, then the identities separate into those of the local football clubs, and even within that identities can separate into the support for a specific player, etc.

What this example makes clear is that within each person resides a combination of identity pieces that make up a whole. By defining identity in this way, Heath goes further and challenges the aspect of tradition by quoting Nezar Al Sayyad: He proposes that people should move away from viewing tradition as a fixed idea, but rather we should *'embrace multiple and transformative states of identity'*. (Heath, 2009:4) Identity and genius loci should be viewed as non-fixed entities. *'...no culture is monolithic'* (Heath 2009:3). Understanding identity in this way allows us to

assume that new influences such as collective memory can over time become a part of what is deemed local culture (fig.07), even across socio-economic barriers.¹

It introduces the possibility for shifts and changes to occur in identity/tradition, which is normally read as a static entity. Identities can be grown/evolved through experience. Therefore Tzonis' attitude rings true that space can evoke an identity, as well as that space has the power to be used as a social tool.

The next aspect in this topic that should be challenged is why we as people feel the need for an identity as an individual, but also as a collective society to feel oriented in a place and time. In *Sense of Identity, Spirit of Place* (1996) Author C. Norberg-Schulz that these needs in humans still remain as a natural instinct, even though it might not seem so with the illusion of a 'global community' where people have 'long time believed that science and technology had freed [them] from a direct dependence on places' (Norberg-Schulz, 1996:43).

Quoting Kevin Lynch's *Image of a City* (1960), he describes man as a mobile organism that constantly needs to be able to orient itself. This forms the basis of the vast topic of identity and how it can be evoked by the built environment that surrounds us.²

This explains how in a more globalised world, with the homogenisation of architecture, people lose their orientation. Where one would assume that rather exactly through this globalisation, this process of orienting would not be necessary anymore because of technology and media, it actually becomes clear that as humans a reference of ourselves in our environment gives us comfort. Architecture has the "power to make people become aware of their common past and participate in their collective memory." (Tzonis, 2003:15)

So why do people feel a loss of identity within the current context? It once more brings us back to Tzonis' description of a globalised environment and the loss of the particular. Or as Kenneth Frampton describes it in his essay *Towards a Critical Regionalism: Six Points for an Architecture of Resistance* in the publication *Postmodern Culture* (Foster H. ed. 1985): the homogeneity inherent in modern society. Kenneth Frampton's essay in the publication *Postmodern Culture* (Foster H. ed. 1985) describes the core principal of Critical Regionalism as the resistance to the homogeneity inherent in modern society.

¹ [Al Sayyad] contends that while hybridised cultural expressions are the norm, particularly among colonised cultures, there are discernible patterns of human adjustment within the hybridized constructions of identity that define regional or sub-regional distinctiveness. (Al Sayyad in Heath, 2009:6)

² The German-born American architect Gerhard Kallmann once told a story which illustrates what this means. Visiting at the end of the Second World War his native Berlin after many years of absence, he wanted to see the house where he had grown up. As must be expected in Berlin, the house had disappeared, and Mr Kallmann felt somewhat lost. Then he suddenly recognised the typical pavement of the sidewalk: the floor on which he had played as a child! And he experienced a strong feeling of having returned home. (Norberg-Schulz, 1996:424).

opposite page fig.07 - amaXhosa - fashion range.
(source: africafashionguide. Image by: unknown)

Culture is not monolithic. It is subject to external influences and over time absorbs other characteristics.

"Inspired by my vision to create a modern Xhosa-inspired knitwear collection that would be suitable for Xhosa initiates, who are prescribed by tradition to dress up in new dignified formal clothing for six months after initiation."
- Laduma Ngxokolo - fashion designer

Within this he quotes Paul Ricoeur posing the two inherent situations of paradox of 'how to become modern and return to sources;' and 'how to revive an old, dormant civilisation and take part in universal civilisation.' (Frampton, 1985:21).

Frampton uses these paradoxical statements as his argument that architecture should relocate itself to the position of a mediator. 'The fundamental strategy of Critical Regionalism is to mediate the impact of universal civilisation with elements derived indirectly from the peculiarities of a particular place.' (Frampton, 1985:21) In this argument he joins Ricoeur in referring to a future need 'for re-synthesising principles and elements drawn from diverse origins and quite different ideological sets...' (Frampton, 1985:21).

From the point of view of a mediator he substantiates it by the examples of use of local materials or the utilisation of local methods for management of local climate instead of the use of 'the ubiquitous air conditioner' (Frampton, 1985:27); however he warns that this has the tendency to advance to the extent of 'sentimental regionalism' (Frampton, 1985:20), a retrospective conservative vernacular obsession.

So in essence Frampton alludes to a refreshed Critical Regionalism in line with the issues above, and that this has the potential to not only mediate between a globalisation and sentimental regionalism, but also has the power to mediate between a simultaneously fragmented and homogenised postmodern world.

This realisation is important for the agenda of the topic of identity in a fragmented society. The notion of architecture having the power of being a social tool, a mediator, can be argued to go beyond the issues of post-modern endeavours, but also reach into dealing with multiple cross-cultural scenarios and the evolution of a cohesive identity from the basis of many.



THE LOCAL CONTEXT:

Post-Apartheid South Africa

After getting an understanding of the concept of identity, it is important to establish the conditions of the lens that this information would be filtered through for the sake of the argument in this paper. Therefore the next chapter will establish an objective illustration of the context of South Africa of the last 40 years, with South Africa's 'most notorious high-rise' as a metaphor.

Ponte City: a perspective

Described as the tallest residential building in Africa, Ponte City - also known as Ponte Tower, or simply: Ponte - is situated in Hillbrow, a neighbourhood known as one of 'South Africa's most dangerous neighbourhoods' (Bauer, 2012) in the city centre of Johannesburg. The 54 storey cylindrical apartment building has a fascinating history (fig. 08). **Drawing up a portrait of this building, one can draw parallels between the building's 40+ year life and the post-apartheid South African context.**³

In popular media portraits of the building, Ponte residents today like Malcom Rees (video: *Ponte Tower* 2012), remember the building as the 'icon of decadence': a soaring tower 'of *crème de la crème white living*' in the height of the Apartheid era (fig. 09). "If you stayed here, you were probably making a lot of cash", Rees says. When the building opened for the first time in 1975, only white people were allowed to live here under the laws of Apartheid. However during the 1980's the situation in Hillbrow changed: 'the middle [and upper] class was fleeing to the suburbs' (Smith, 2015,) and by the mid and late 1990's Hillbrow - and with it Ponte - became 'a lair for the nefarious activities of the Johannesburg underworld' (Bauer, 2012).⁴ This can potentially be described as a fairly general condition in parts of cities across South Africa in that time.

fig.08 - Ponte Tower
(source: The Guardian. Image by: Alamy)



³ 'Featured in newspaper articles, photography and exhibitions, documentaries and movies, Ponte has come to symbolise the rise and fall and rise again of South Africa's commercial capital' (Smith, 2015).

⁴ 'Residents of that era claim the 11th and 12th floor were completely stripped bare and, along with the downstairs parking lot, were nothing more than spots to score. Both were informal brothels, used as a thoroughfare for those in search of anything ranging from an acid trip to a blow-job.' (Bauer, 2012)

Fortunately Ponte's transformation did not end in despair; with multiple attempts to draw Ponte out of the dark and restore it to its former glory. In 2001 the first attempt by owner company Kempston brought about a fresh outlook for the building. Not an easy task as it *'was easily one of the most dangerous places to live in South Africa'* (Bauer, 2012); with a mountain of refuse and rubble filling the inside core of the building 5 storeys high (Smith, 2015) (fig. 12) In the late 1990s rumours even existed of plans to turn the tower into a prison. (Bauer, 2012)

In 2007 the building was handed over to new ownership and another attempt to renovate the building more was thwarted by the economic crisis, and the building stood, gutted, for almost two years (fig. 13), before the former owners – Kempston – reclaimed their building and completely re-branded its image and turned it into what Ponte is today:

A safe haven island in the overall Hillbrow neighbourhood, the building has strict security with biometric access points and visitor curfews at 9pm (*Ponte Tower*, 2012). Argued to be a necessity for the safety of the building and its residents (fig. 10). This is indicative of the nationwide increase in private security as a reaction to the situation of crime in post-apartheid South Africa. The walls of apartheid came down, and the walls in the suburbs went up.

In the video, *Ponte Tower* (2012) Michael Rees speaks of the difficulty to persuade people to come and visit him in his apartment. And in his article for the *Mail and Guardian* in 2012, Nicholas Bauer says the same.⁵

This is indicative of the stagnated mind-set of some people in South Africa. *"Because of its image, conventionally minded people take quite a bit of convincing"*, Rees says (*Ponte Tower*, 2012). It will take a lot to kill the idea. Even during the 2007 attempt of owners Kempston to re-brand the building, with publicity posters depicting for example a mixed-race gay couple or Indian parents surprising their daughter with an awkward surprise (fig. 15-17), the pre-conceived idea of the *'South African condition'* is hard to change in the mind-sets of the people.

It will take a lot to kill the idea. (fig. 14)



fig.09 - 'Nucleus at Ponte' advertising for the *crème de la crème* life in the original Ponte. (source: Grosskopf Archive. Image by: unknown)

⁵*"Ah, I don't know -, is it safe?" Is a common refrain. Or the rudimentary: "No thanks dude. I don't think my insurance covers me if I'm jacked in Hillbrow." Sometimes I just get a blank stare. (Bauer, 2012)*



fig.10 - Security at Ponte Tower. (source: Flickr. Image by: range commander)

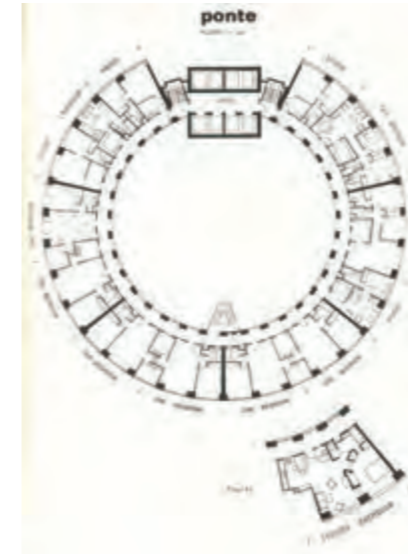
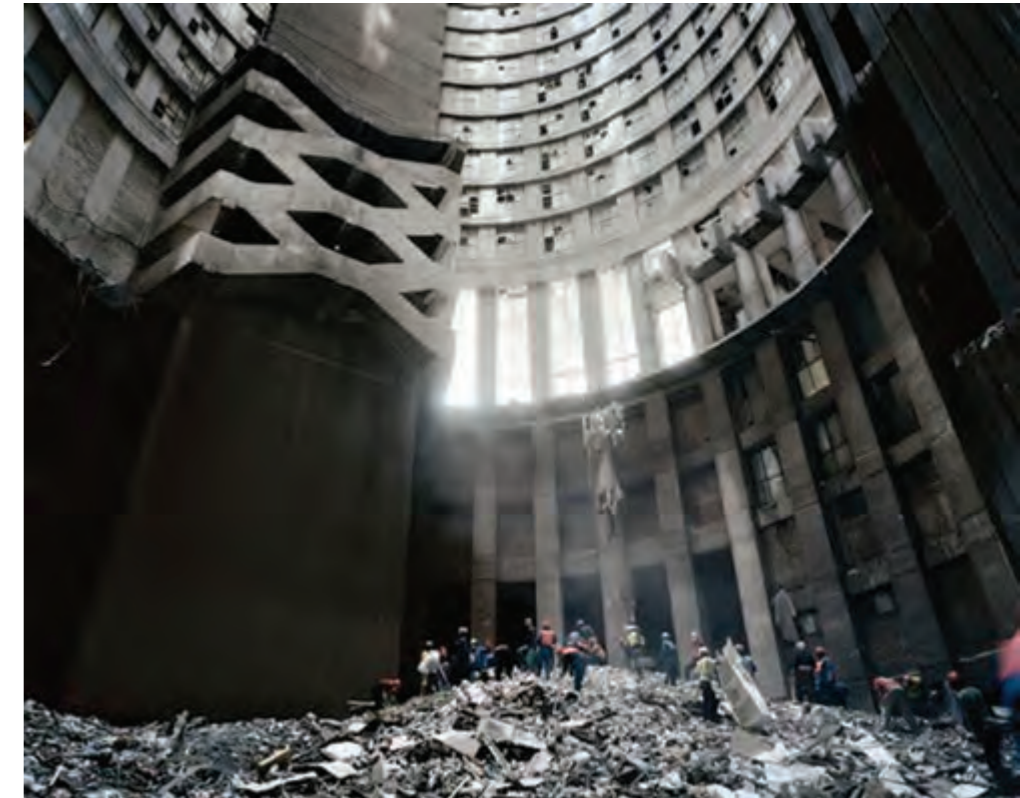


fig.11 - Plan of Ponte Tower. (Source: Planning & Building Developments. 1975. Image by: unknown)



top right: fig.12 - The Ponte hollow core, clean-up of rubble. (Source: Pinterest. Image by: M.Subotzky)



bottom right: fig.13 - Looking up in the Ponte hollow core: before renovation. (Source: Wired. Image by: M.Subotzky)

Khanyisani, a student, and resident living in Ponte with his family, describes the population of the building as mixed. As he describes this mixture, it quickly becomes clear that the population of the floors/levels of the building can be read as the different layers of socio-economic groups in South Africa. The top floors, sparsely populated, large, posh apartments are mostly occupied by white people, and a small percentage of black people. Further down the population density increases somewhat and is entirely made up of working-class black families and residents, and towards the bottom of the tower a large portion of the occupants are of foreign, sub-Saharan origin. (*Ponte Tower*, 2012)

These layers, while being separate floors in Ponte, are indicative of the distribution of people in our urban environments. A remnant from the Apartheid Group Areas Act; there is a general isolation of socioeconomic layers in our society, within specific areas in the cities. People are isolated within their communities/neighbourhoods, and within their mind-set. While people share the same lobby (public space), the same elevators (highways) and the same passages (pavements), in the end, everyone returns to their respective floors (neighbourhoods) at the level of their income bracket.

The time-line depicting the life of Ponte is almost identical to times of South Africa. It is interesting how clearly one can draw parallels. The apartheid condition of a prospering white minority at the cost of a non-white majority, the end of apartheid, the influx of immigrants, the struggle for the country to get off the ground, the rise of the serious crime problem, the culture of fear, a conscious effort to rebuild, renovate and re-brand a country by the few, the struggle against change of mind-set by the many, and most importantly, the lasting isolation and segregation.



left to right:

fig.14 - *AWAKE!* magazine cover, 2005. *Life without fear. The stagnated mindset.* (Vladislavic, I. et al. 2014)

fig.15 - 17 - *Ponte City re-branding Advertisements. The attempt to reintroduce a new image* (Vladislavic, I. et al. 2014)



PART

TWO

TYOLOGY + PROGRAMMING

Once one has understood the concepts of Identity, as well as the complicated context of post-Apartheid South Africa, one has to ask the questions how we as architects should apply principals of design to address the issues of a fragmented society. It is important to locate methods of design that are prevalent in the making of spaces in our context, and attempt to understand the principles that are inherent in these. Typology and Programming can be named as the two overarching schools of thought, thus the following chapter will deal with these as individual sub-chapters, after which an attempt will be made at a synthesis and establishment of what is an appropriate way of designing within our complicated context.

TYOLOGY: Introduction

Typology (in urban planning and architecture) is the taxonomic classification of (usually physical) characteristics commonly found in buildings and urban places, according to their association with different categories, such as intensity of development (from natural or rural to highly urban), degrees of formality, and school of thought (for example, modernist or traditional). Individual characteristics form patterns. Patterns relate elements hierarchically across physical scales (from small details to large systems). – (Wikipedia: Typology 2016)

To understand Typology in its essence, one needs to first consider its evolution as a term.

The definition of the term Typology has undergone an evolution that spans hundreds of years. Centuries of theoretical discourse has attempted to define and re-define its meaning that has spanned many cultures as well as many movements in architecture. The discourse is defined by an attitude towards the term.

The root of typology lies in the word *Type*. In his *Architectural Guides* **Nicholas Pevsner** (1951-75) classifies groups of buildings as types that are ‘commonly understood as buildings grouped by their function, that is schools, hospitals, prisons, churches and so on’ (Lee, 2011). The first time the concept of type was introduced to the discourse of architecture was by **Antoine-Chrysostome Quatremere de Quincy** in the *Dictionnaire historique d’architecture* in 1825 and in his sense ‘the word type presents less the image of a thing or copy or imitate completely than the idea of an element which ought itself to serve as a rule for the model’ (Quatremere de Quincy, 1825). So in this idea the type is a concept/idea or symbolic meaning that is inherent in an object. (Lee, 2011)

After this a canon of theorists have de-constructed and reconstructed, defined and re-defined the term of Type:

Gottfried Semper: Type: the idea that must be understood through the potentials of four building techniques: terracing (masonry), roofing (carpentry), the hearth (ceramics) and walling (textiles). This approaches the term from a practical perspective. (Semper in Lee, 2011)

Giulio Carlo Argan: ‘For Argan, ‘type’ is an idea [that lies] in building precedents and therefore in the history of architecture.’ (Argan in Lee, 2011). With this Argan brought the term out of the practical perspective and settled it into the idea of functionality.

After this **Aldo Rossi** brought the term typology into the field of urban discourse and defined type as ‘...the very idea of architecture, that which is closest to its essence’ (Rossi, 1982:41). However important to note here is that Rossi doesn’t just approach the buildings as individual entities but on an urban level that speaks of the essence of a city with its consciousness and its history; this again notions at the presence of a collective knowledge that defines a type (Rossi, 1982).

The concept of typology as a design method, instead of merely an analytical tool, was introduced by **Jean-Nicolas-Loius Durand** (Durand, 1802-5). Durand introduces ‘precepts that are fundamental to working typologically: precedents, classification, taxonomy, continuity, repetition, differentiation and reinvention’ (Lee, 2011).

These are merely a fraction of professionals that have participated in the discourse on the topic, but they represent some milestones in the evolution of the thought that is connected to Type. What is most important to understand is that typology does not refer to a model such as in the modernist, **Le Corbusian** sense of a replicable model that is reproduced in its entirety, but that it provides a framework from which the resultant form, technique and execution can differ from object to object.

As all of the point of views above illustrate: **Typology rests on an element of preceding knowledge; precedent is at the root of this method of design. This could be seen as a benefit as well as a limitation. Preceding knowledge in the typological sense, as well as the typological method can be scoped and taught. Yet the framework can also be seen as limiting to exploration, and adjustment to differences in global cultures and an evolution societies. The question would always remain, what culture does the ‘preceding body of knowledge’ originate from. Is this framework appropriate for a specific context? Is Typology as a method as well as a type framework flexible enough to readjust itself to the rapid changes that are occurring in global cultures?**

PROGRAMMING: *Introduction* ⁹

A programme in the general sense describes a list of proceedings, whether for a show, a meeting or a conference, etc. This character is taken further when viewed from a social psychology perspective: the concept of a programmer is looked at as a separate entity to architectural designer (Mazumdar, S. 1992). It consists of the methods of gathering information (*mapping*) on human beings and their needs (*individual, as a group, or as a collective*) for a specific environment. The product of this process would be something architects have come to call a list of accommodations for a specific project. Defining a programme in this way is very utilitarian.

From an architectural point of view a programme translates to a function, a use, an event. From this, in the process of architectural design, the method of programming can be described as **sequencing, combining, juxtaposing, and arranging, superimposing, cross-programming and re-defining** these events in spaces. This can definitely be seen as a benefit of this method, as it holds a freedom within that lends itself to a complete redefinition of the *'essence'* of a building. It gives architecture the power to re-invent social space — and with it — society. The work of Rem Koolhaas (OMA) reflects this aspect of re-invention: *"Programmatic innovations include the production of fields of social encounter, new functional juxtapositions, and forms of spatial segmentation"* (Dovey, & Dickson, 2002:5). But most importantly, programming has allowed his work to be termed as an architecture of emancipation (Zaera, & Koolhaas, 1992). ^{6 + 7}

Another strong voice in the discourse of programming is Bernard Tschumi. His work can be described as an architecture that *'non-hierarchically engages balances of power through programmatic and spatial devices'* (Wikipedia: B. Tschumi 2016). He builds this discourse on countering the current reduction of *'architecture as a form of knowledge'* to *'architecture as knowledge of form'* (Steiner, E. 2015). He reiterates this statement in numerous publications and interviews as his strongest argument of departure. Throughout his (*still on-going*) career he has experimented by introducing other methods of thought-production into his research: methods such as film/screenplay (Eisenstein) and abstract imagery. This has given him the platform to freely develop his theory of *space, event and movement*, and their relationship/disjunction with/from one another.⁸

⁶*"Koolhaas is inspired by the notion of an architecture of liberation in terms of the multiple 'freedoms' for new forms of action that architecture is seen to make possible. Space is programmed for indefinite function and chance encounter."* (Dovey & Dickson, 2002:5)

⁷*"Koolhaas seeks an architecture that encourages an irruption of events, social encounters, and opportunities for action. Rather than designing with a particular hierarchy of spaces and narratives of spatial movement in mind, he generally works towards a spatial structure that allows multiplicity of choices for pedestrian flow and encounter."* (Dovey & Dickson, 2002:5)



Moving away from the modernist claim that *'form follows function—'* he completely separates an event from the space that it happens in and introduces three new concepts of relationship between the two: reciprocity, indifference, or conflict. By doing that he initiated completely new re-imaginings of spaces and their use. Such as the famous **'skydiving in an elevator shaft'** — **'pole vaulting in a chapel'** — and **'cycling in a Laundromat'** (Tschumi, B. 1996:146) (fig. 18–20). These different forms of arranging event/space/movement provide a range of possibilities for challenging ourselves in our environment, for reinventing ourselves, evolving identity

This ambition is the basis of what makes programming — incl. all its various manifestations — a flexible, and progressive method of space making.

On the other hand, programming relies on a firm social knowledge of the context of the programs that one is working with. Mapping and research is of more importance here than in other conventional methods of design. Even mapping itself can also be ambiguous as the categories of mapping that are chosen by a designer to inform his design are mostly subjective and depend on the discretion and knowledge of the designer. This emphasis on diligence in research for the success of programming is a risk. It opens it up to misinterpretation and mis-implementation, assumptions and appropriation.



⁸*"[There is] no architecture without event, no architecture without action, without activities, without functions."* (Tschumi, B. 1996:255)

⁹*"Programming can be a way of surfacing and resolving differences and conflicts regarding space. It can be a form of negotiation, and exchange, a quid pro quo, a way of arriving at negotiated agreements, building consensus and continuing group identity. Programming can be a form of occupant education about social organisation and about the building. It can be a political device or strategy or even a ritual."* (Mazumdar, S. 1992:79)

left to right:

fig.18 - *Skydiving in an Elevator Shaft.*
(author)

fig.19 - *Pole-vault in a Cathedral.*
(author)

fig.20 - *Speed Cycling in a Laundromat*
(author)



PART

THREE

Dialectic:

The search for an appropriate method of design for the evolution of a collective identity in a contemporary South Africa.

Tzonis teaches us about the power of space as a social tool to allow people to participate in a collective memory; this is the first step to evolving identity/identities. The question remains whether in South Africa, such a collective identity exists.

The *Genius Loci* in public space today needs to be challenged from a perspective that it is not a respondent to an identity (e.g. *aesthetic*), but that the memories and cultures inherent in our societies should be allowed to coexist within it.

Heath speaks of collective memory and that this is the point where a collective identity lives. Through apartheid and the racial segregation, and the post-apartheid condition, the opposite is the case in South Africa. In light of Heath's metaphor one could name the event a social disaster. Yet one that had the opposite effect than what Heath suggests. Through apartheid, separate memories, opposing memories were created in the same space.

Fortunately, through Heath we found that memory - and along with it culture - is not monolithic. And therefore this condition of fragmentation in society can be addressed. He speaks about different layers of identity within people, and within societies. Public space could be the tool to introduce coexistence between these layers, and perhaps over time even introduce a layer that can over-arch the *collective* and unify them all under an identity of compassion and understanding.

At this point in time we are a fragmented society. And each fragment, as Norberg-Schulz writes, has the need to orient itself and relate itself with its environment. For this to be possible, coexistence has to be established in public space and this can over time shape the collective memory.

Public space in South Africa should be a mediator between - as Frampton wrote - a simultaneously fragmented but homogenised world, which in our context receives a whole new meaning.

The principles of programming by Frampton seem to address this kind of social engagement of public space. The motion of figuring out a '*contemporary African aesthetic*' could be argued as futile and as an exercise of sentimental regionalism. They have the danger to become a vernacular obsession, and from this critical regionalist approach it is impossible to establish a contemporary coexistence.

The most important obstacle to establishing space of coexistence is the stagnated mind-set. Through Apartheid, identities were designed to be opposed, isolated and unrelated. So the segregated nature of our cities puts extra

pressure on public space to become a mediator. It is important here also to note that true change of mind-set can not only be achieved through incremental monumental experiences such as visits to museums or events. But rather on a day-to-day basis that slowly affects a state of mind on a subconscious level. This way the issue of fear and stagnated state-of-mind can be overcome. (fig. 14)

While we now have a clear impression of the monumental task at hand, can we thus make use of a method of design that references precedent knowledge of contexts fundamentally different than ours? With Typology holding this as one of their main aspects one would be quick to conclude that it is not an appropriate way of working in our context.

What is important to note here though is that a Typology is not a concept that is limited to foreign contexts. Typologies that are unique to our context do exist. Yet it is reasonable to state that many typologies could be described as only referencing *foreign* precedent knowledge. And this is where a typological approach in our context becomes complicated in light with the ambition of this dissertation. **Typologies can only be a good method when common knowledge of precedent exists of them in the narrative of all concerning identity brackets.**

When following Tschumi's vision of programming it is easy to draw the direct benefits of this method for designing as a social tool. Programming allows us, with its *freedom*, to carefully assemble public space, with various (*all?*) layers of identities amongst each other in a way to provoke an engagement (*events*) in the various ways that Koolhaas described possible. However, something that would make this process very challenging is the multitude of social conditions that have to be understood in order to sensitively be able to apply them in the methods of programming. In-depth knowledge, (*such as cultural and inscribed memory*) that cannot necessarily be taught, has to be meticulously gathered and understood to enable a confident process of designing.

In the case of a project where implementing a (*precedented*) Typology is unavoidable, it should be boiled down to its absolute basic essential parts. These should then be viewed as a flexible framework which can be analysed in terms of its relevance to the context. This then provides the platform for this framework to be programmed in order to transform it for the local context. Perhaps to the point where it is completely redefined. This idea merges Typology and Programming as a hybrid in a sense. With Programming being the more dominant process which uses Typology as a loose frame of reference. Can we call it **TYPROGRAMMING?**

While both methods of design have their challenges when addressing the issue above, the quality that unites them both is that, in the contemporary sense, they both allow themselves to be completely separated from form. The space, now, steps into foreground: a landscape of public space for a society that can live amongst one another.

A large, stylized number '4' is rendered in a light gray color, serving as a background graphic for the left side of the page. It is positioned behind the text 'PART'.

PART

FOUR

LOCATION OF PROJECT

Reasons for selection of specific Type/Site

As illustrated in the introduction, public space was placed at the centre of this investigation from the beginning. And the decision of the specific type that was to be used to test the established principals will focus on the same type of space.

A public space typology is to be selected, one that is flexible and dominant in our urban environments. With this in mind, public transport was selected as a *Type*. Buildings of a public transport nature are one of the only building types that have such a large and varying element of public space inherent within them. Train stations in particular usually form a space in our cities which, through their functional nature of serving as a link between the urban fabric and the infrastructural modes of public transport on such a large scale, provide a platform for human to human interaction that can evolve social entities on a daily basis; since it is obvious that, apart from using a motor vehicle, if one wants to travel from one place to another, one has to pass through a train station of some kind, and so will participate in the spatial gathering of all people that share that basic need of movement.

What allows these buildings to remain these elements of relevance in our urban environments is their ability to adapt. Train stations have been a type of building that has constantly retained its primary function throughout hundreds of years, yet also has permanently evolved itself in all other aspects such as technological advances, political and social dynamics, economic developments, cultural conditions, and lately environmental concerns as public transport can address issues of pollution and sustainability, congestion and urban sprawl (fig. 21 + 22). This dynamic between a fixed, infrastructural utility, and social space, is quite unique.

From a typological view, stations respond to three aspects of context (*see Appendix B*). One being the functional context, second the urban context, and third the placement of the station within the railway network. These three categories are the main drivers to the structure of a typology, and

“Central to any nation’s growth and prosperity is the commitment and tenacity to recognise and deal with the challenges of today and the wisdom and insight to identify and work towards a vision of tomorrow.” – Mr. D. Omar, Minister of Transport (Boesak, E. et al. 2002)

top fig.21 - *The etching shows the interior of the Frankfurt Terminal Station, Germany at the time of opening in 1808. (source: dmm.travel. Image by: unknown)*

below fig.22 - *Image showing the interior of the Frankfurt Terminal Station, Germany, in the 21st century. (source: flickr. Image by: zacke82)*



they are the only binding factors of the system. The remaining structural and standard requirements of these buildings are elemental and are able to be adjusted and applied to suit any context. And since the context of technology, economics and society in our urban environments are subject to rapid change, it is fortunate that these elements are so flexible. This flexibility of the **TPOLOGY** allows it to be subject to **PROGRAMMING** and through this can be re-defined as social spaces that can reflect social/political/economical conditions that are ever evolving.

Train stations as public space have undergone a fascinating transformation in South Africa. From humble beginnings in colonial times, through the early days of South African cities, the oppression of apartheid, the fight for freedom, and the current context of post-apartheid South Africa.

The value of places of public transport as public space is clear, and its potential as a tool for re-structuring/mediating a social society is great. Can a railway station be a tool for the evolution of a society in South Africa that is coexistent?

The Cape Town Station (fig. 23-25) has undergone vigorous changes during its lifetime (*see part V.a*). It has responded to all the above mentioned advances. However due to the fact that there was always enough space in and around the area it is situated now, it was able to be moved and re-built several times. This is not possible anymore as the city around it has grown so dense. However social change in South Africa is imminent. And with railway stations being social spaces at the core, the Cape Town Station must adjust. Through the explorations above, the elements of the station can now be analysed, and reduced down to the most important core aspects. From that basis, through programming, it can be re-defined to be more relevant in the contemporary context and its social condition.

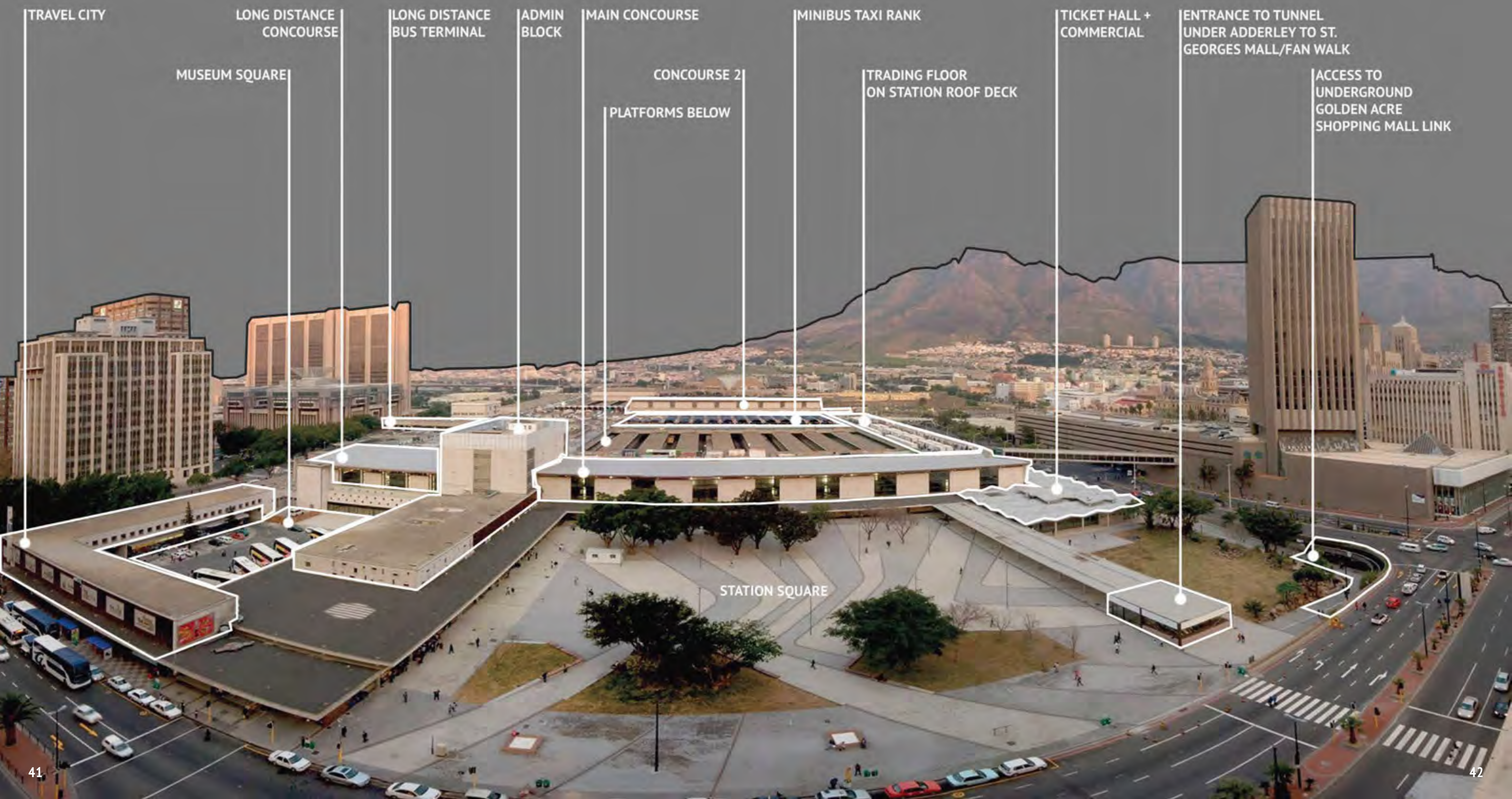
fig.23 - *Bird's Eye view of the full Cape Town Station precinct. Viewed from an eastern direction. (satellite image source: Apple Maps. Image edit by: author)*





fig.24 - Satellite Image Diagram showing the location of the Cape Town Station within the urban environment of the CBD. With the yellow lines indicating the main roads and the turquoise lines indication the National Highways 1+2. (Image by: author, satellite image from Google Maps)

fig.25 - Annotated bird's eye view of Cape Town Station. (Image by: author. Base photograph source: Makeka Design Lab)





PART

FIVE

THE CASE OF THE CAPE TOWN STATION

The History of the Cape Town Station

Tracing the history of railway stations (Appendix A), and more in depth the history of the Cape Town station, one can clearly see that it played an integral part in the development of the City of Cape Town. It changed location, shape and form a few times and through all of these transformations it embodied the essence of the city and the life within. It represented a reflection of the people and the social conditions in Cape Town.

“[The Cape Town] station is undoubtedly one of the most remarkable public places whose own life story parallels that of the new South African nation in a most profound way.” – Mr. D. Omar, Minister of Transport (Boesak, E. et al. 2002:03)

As described in the book *Cape Town Station, Reflection, Reality and Renaissance 1861-2002* (Boesak, E. et al 2002) the Cape Town station was a landmark in the landscape from the beginnings of a colonial settlement at the start of the 19th century, through the development of a unique city at the bottom of the African continent, as well as the oppression of the apartheid era and the eventual liberation of the people, all the way into a new millennium at the heart of the Mother City.

Before the first station was built, the first train lines in South Africa were laid in 1859 and in the same year the first locomotive (one of 14) arrived on the shores of Cape Town via ship. In 1860 the first passenger transport began and these locomotives served the transport network until 1881.

In 1859 it was decided to build a station building, on a piece of land that was positioned between Strand and Castle Street, (*the north-east corner of the Grand Parade today*) (fig. 26). After a lengthy planning process, on 4 January 1861 construction began on the first Cape Town station. This building was nothing noteworthy and can be described as simple shed with open platforms in the rear.

Due to the rapid growth of the railway industry, in 1870 a new station was planned to replace the old one and by 1877 the new station building was opened (fig. 27) with tell-tale arched iron/glass roof over the tracks (fig. 28).



fig.26 - Rear view of first train station building in Cape Town.
(source: Cape Newspaper Archives. Image by: unknown)



fig.27 - 1877 Cape Town Station front facade.
(source: Cape Newspaper Archives. Image by: unknown)

The ‘front’ of the station was built in the Victorian style and represented the cultural and social conditions of the time (fig. 29). Over the years the station was expanded to the point where in 1905 over 250 trains arrived and departed at the station daily.

In 1968 the Victorian station was completely demolished in stages (fig.30 +31) and the new station, as we know it today was constructed. Again, reflecting the current movements in architecture and social conditions with a modernist design that was integrated into the modernist master plan for the foreshore at the time (fig. 32). This station had several entrances that were used during apartheid for white-only and non-white commuters. Separate station areas were defined for different ‘classes of race’ (fig. 33).

In a study done by the *South African Heritage Council*, (Abrahamse, C. et al. 2013) it is told that the project of the new station was a story of contestation and political conflict between the City of Cape Town and the National Government that lasted from 1937 - 1947. The government initiated the new modernist town planning scheme for the foreshore and so had control over the area. The City of Cape Town (CoCT) was opposed to the idea of the station on Strand Street, as they argued it would cut off the foreshore from the eastern part of the city. ‘The

situation gave rise to two areas of conflict that extended from the wider, urban scale to the scale of the station building itself (Abrahamse, C. et al. 2013:10).

When the racial segregation laws were introduced the station project purposefully designed to accommodate these, and thus is one of few buildings that have a lasting legacy of Apartheid on our built environment. The ‘non-white’ concourse was placed on top of the railway platforms, and a large ramp/staircase was to be built to ‘seamlessly’ connect this area to the Grand Parade, this design was never realised. (Abrahamse, C. et al. 2013:10)

“The importance of the Cape Town Station building for the Nationalist Party in asserting their presence and power in the Cape cannot be underestimated.” (Abrahamse, C. et al. 2013:11)

Being a place of public transport, the station played a large role in the mobilisation of large masses of people that staged protests and marches during the fight for liberation and the struggle against racial segregation:

“The Parade and Station became sites of victorious celebration only to be outmatched nine days later, on 11 February 1990, when Nelson Mandela ... addressed the massive crowd on the Parade from the balcony of City Hall. In the background Cape Town Station stood as silent witness to the birth of a new South Africa” (Boesak, E. et al. 2002:20)

The taxi terminus on the roof deck of the station was built in 1994 as well as the previously non-white platforms were upgraded and the station was renovated to allow for more natural light and ventilation.

Following this the last – and most recent – upgrade the station experienced was the renovation for the 2010 FIFA soccer world cup that saw the station forecourt re-defined as public space and the interior was cleared and re-finished. This is the station we know today (fig. 34).

It is clear what a central role the Cape Town station played in the development of the city as a whole and in the lives of the Cape Town people and one can comfortably say that it will continue to be an integral part of the transformations of the new South Africa to a vision we all can be proud of.



left fig.28 – the arched train shed of Cape Town station 1877. (source: Cape Newspaper Archives. Image by: unknown)

right fig.29 – Front facade of the Victorian Cape Town Station building 1897. (source: Cape Newspaper Archives. Image by: unknown)

left to right fig.30 – New Cape Town station being built with last piece of old station remaining to be demolished.

fig.31 – Arched train shed being demolished.

fig.32 – New Cape Town Station train shed with concrete roof. (source: Cape Newspaper Archives. Image by: unknown)



left fig.33 – white-only ticketing station at Cape Town Station during Apartheid. (source: Cape Newspaper Archives. Image by: unknown)

right fig.34 – Cape Town station as we know today (2016). (source: Cape Newspaper Archives. Image by: unknown)

Mapping and Statistical Information of the Cape Town Station

Metropolitan Context Analysis: This map (fig. 36) was created by taking a map the illustrates racial demographics across the metropole area of Cape Town and overlaying a drawing of the actual active train lines.

This clearly shows the position of the Cape Town Station as the “head” of a large network which permeates all demographics.

It places the station in a very important and powerful position regarding the ambition of this dissertation. The potential influence a ‘transformation’ of the Cape Town Station could have, and how it could permeate all demographic areas of the city is evident.

fig.35 - Cape Town railway network.
(author: unknown. source: Metrorail)

CAPE TOWN - DEMOGRAPHIC MAP

THE RAILWAY NETWORK AND THE PEOPLE

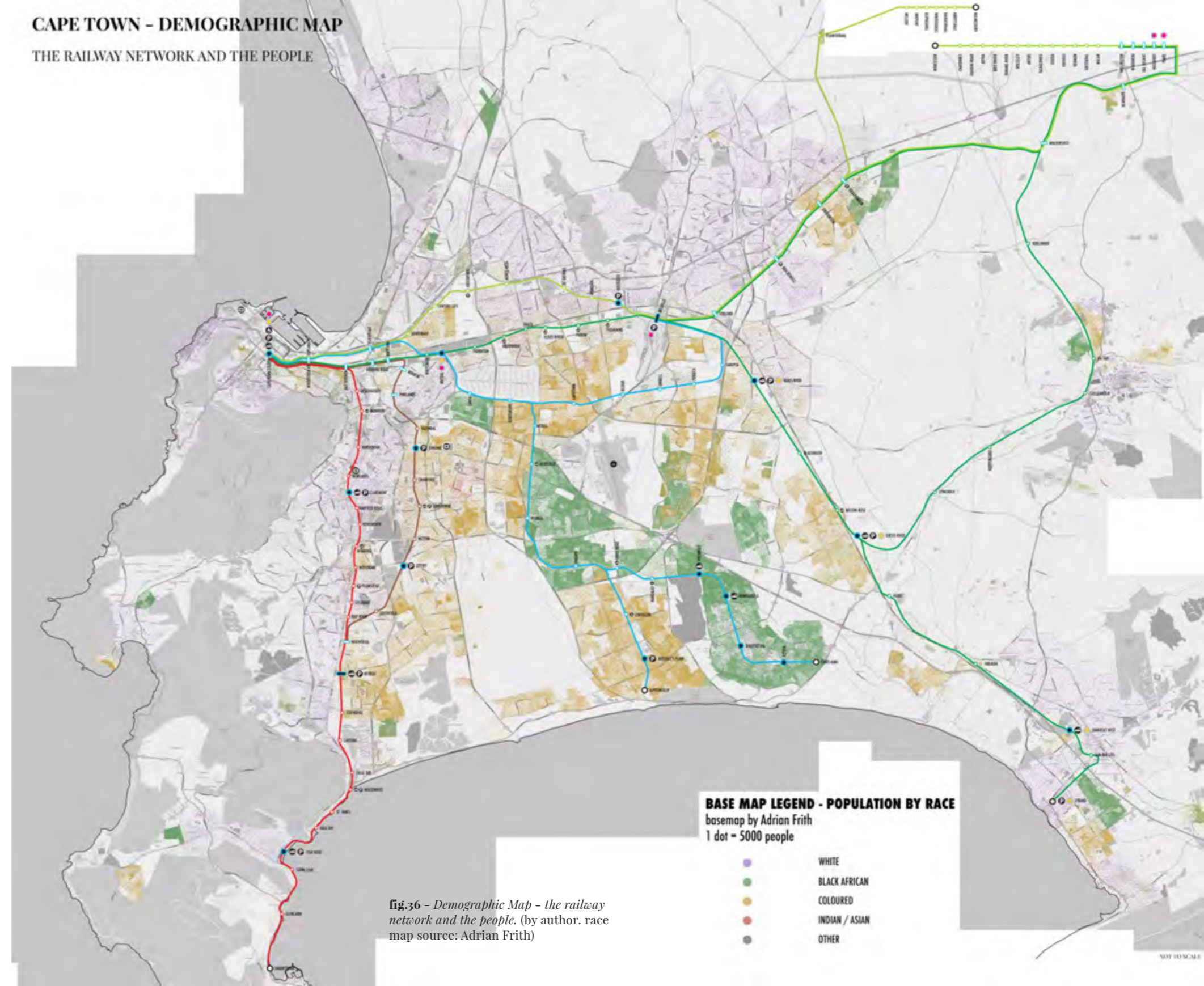
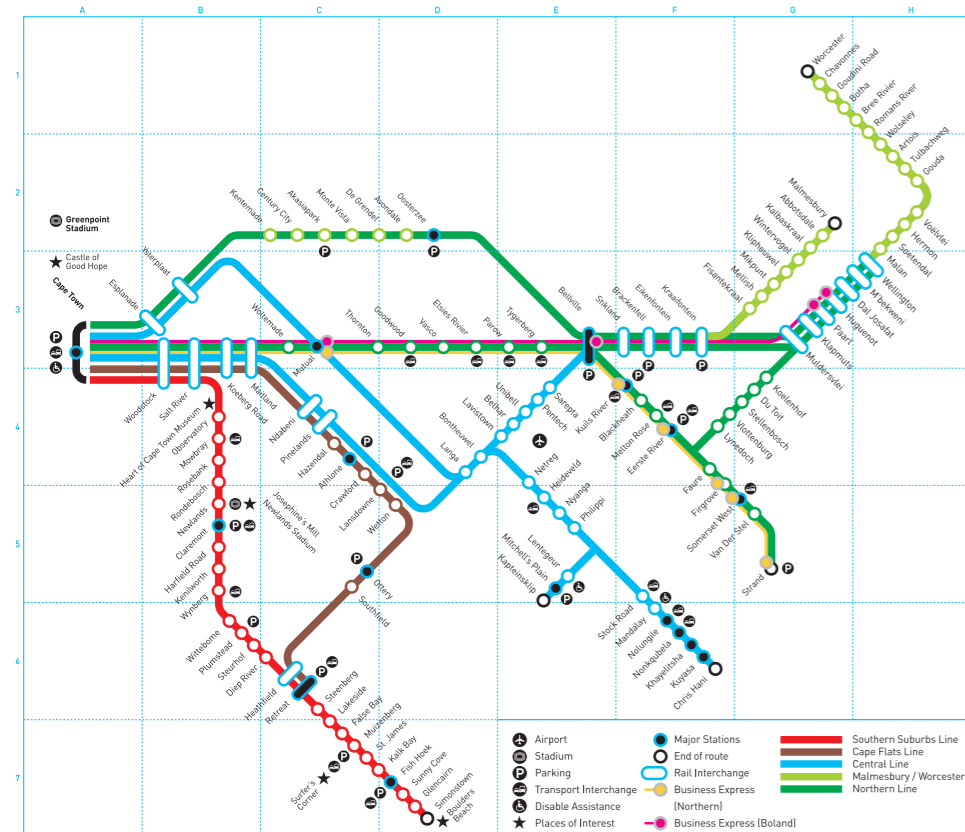


fig.36 - Demographic Map - the railway network and the people. (by author. race map source: Adrian Frith)

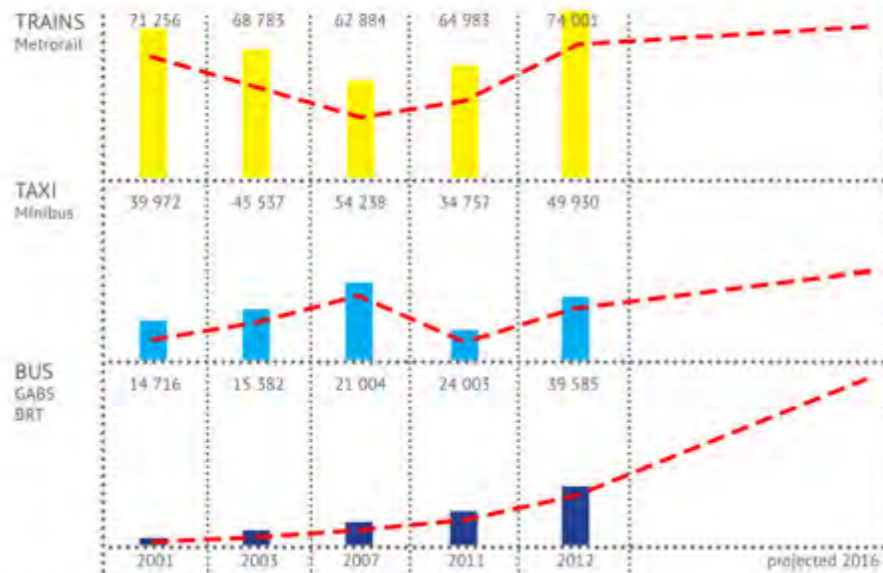


Statistical Data:

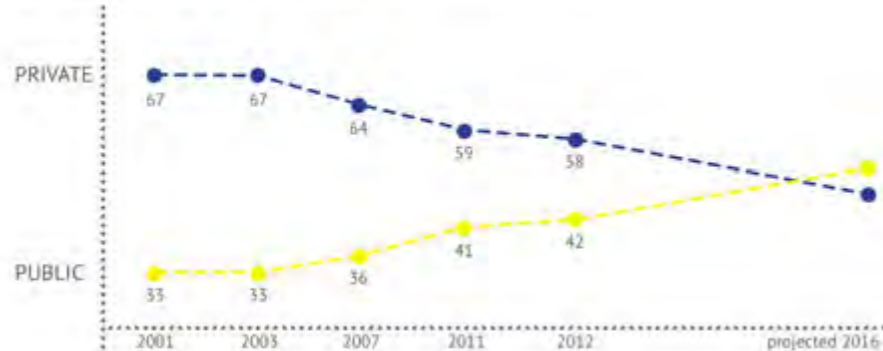
TOTAL LENGTH OF RAILWAY NETWORK



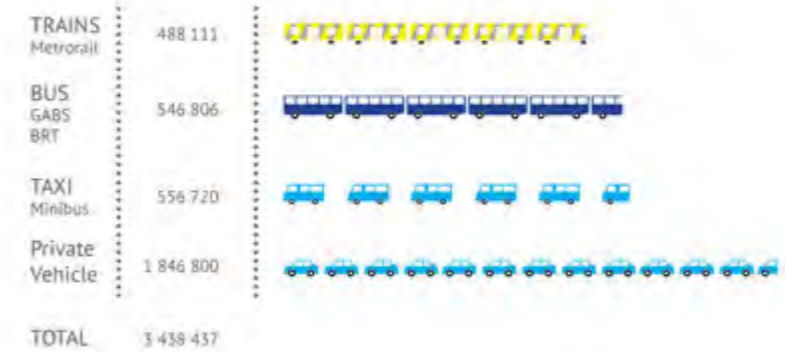
HISTORY OF DAILY PUBLIC TRANSPORT PASSENGER TRIPS INTO CBD



HISTORY OF MODAL SPLIT INTO CBD



DAILY TRANSPORT FIGURES ACROSS THE METROPOLE AREA (2014)



ALL DAY PASSENGER ACTIVITY AT CAPE TOWN PUBLIC TRANSPORT INTERCHANGE HUB (2011-13)

Cape Town Station is the busiest Public Transport Interchange in The Metropole Area



TRANSPORT MODAL SPLIT (2014)



Summary: The analysis of this data clearly shows a changing trend in the use of public transport modes across the city of Cape Town. Especially to and from Cape Town's City Centre.

When projected, the amount of passengers that make use of public transport will surpass the people who choose private methods of transport.

This definitely relies on the desperately needed upgrade of the public transport infrastructure, incl. the rolling stock of Metrorail.

The trend of increase in the utilisation of public transport supports the notion that Public Transport Interchanges such as the Cape Town Station will become more influential over time.

fig.37 - 32 - Statistical Information of Public Transport Infrastructure of the City of Cape Town. (by author. Data source: TCT comprehensive Integrated Transport Plan 2013 - 2018; 2015 Review; by The City of Cape Town's Transport Authority.)

This model illustrates the relationship the station has with its surrounding urban context in terms of movement, density and urban scale. It poses a large barrier within the urban network, and its seriously out of proportion in terms of urban scale and density.

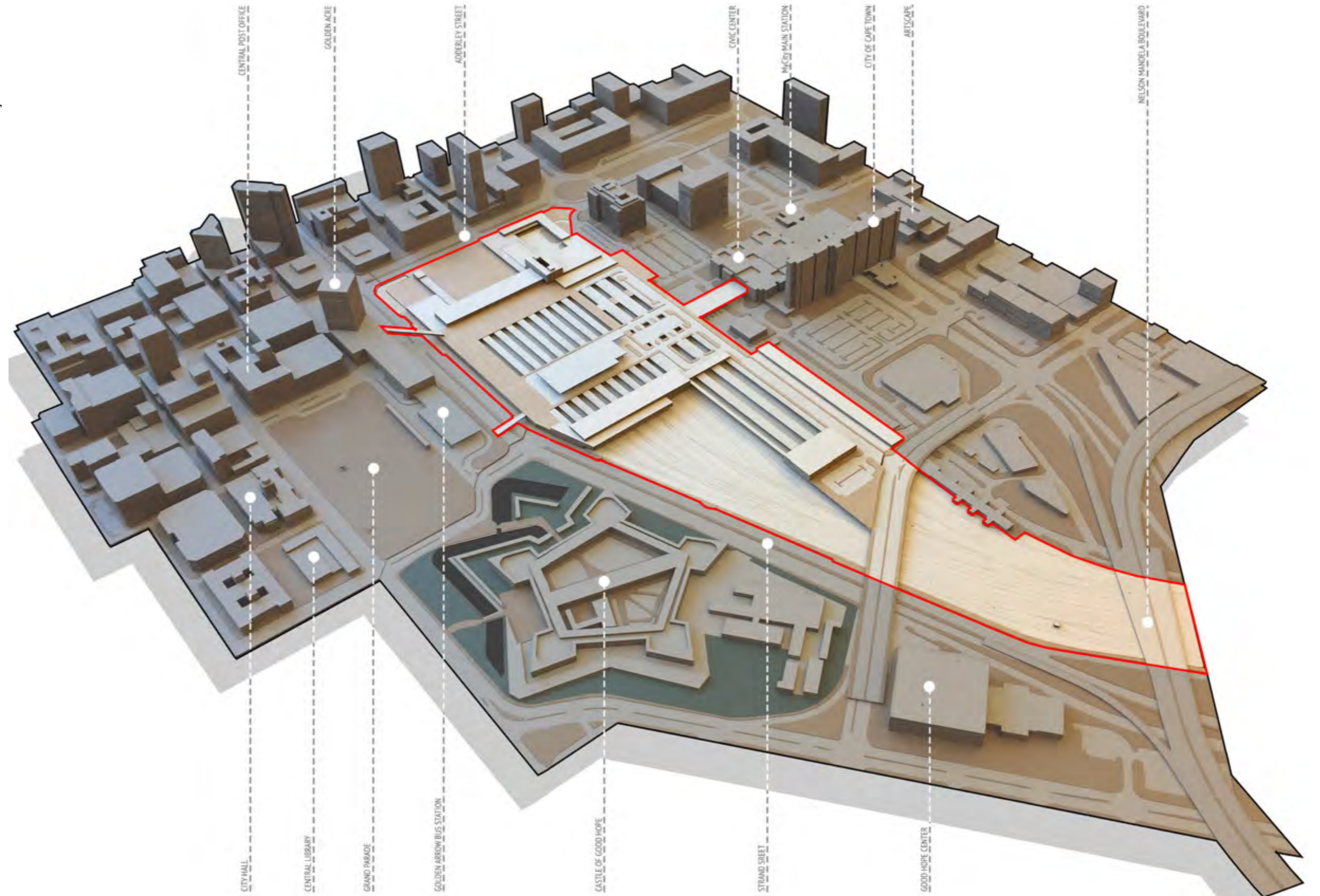
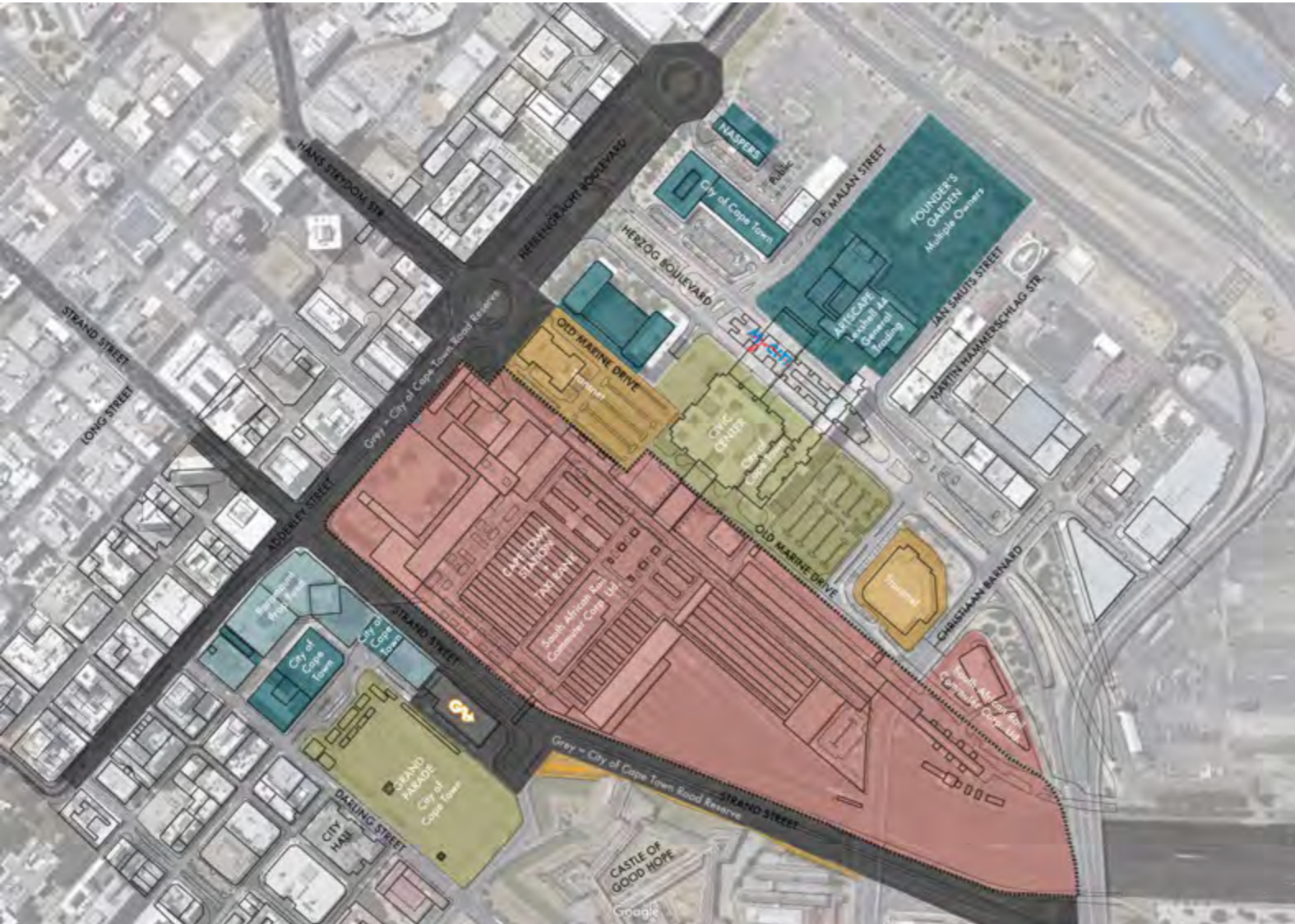


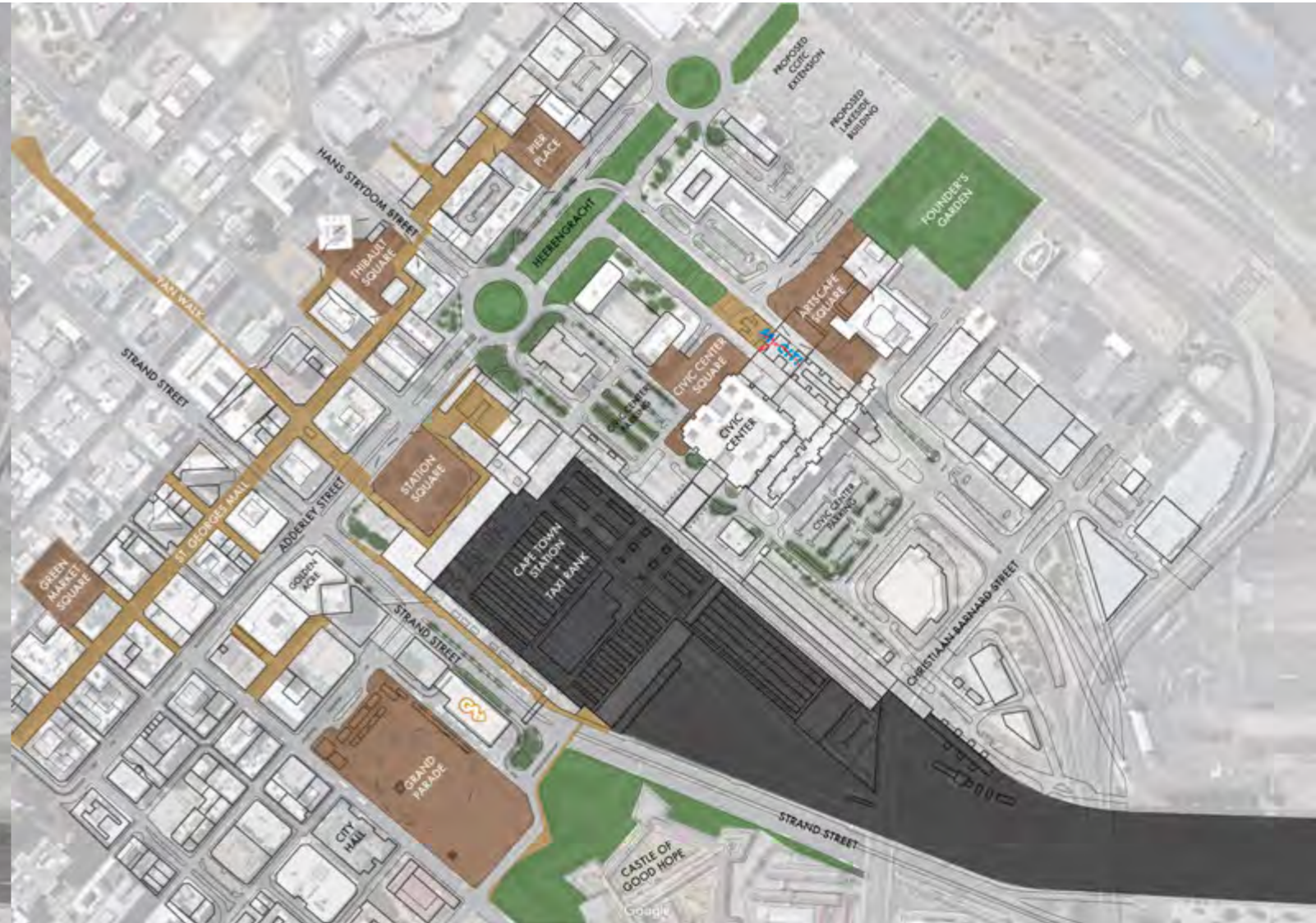
fig.43 - Context model of the Cape Town Station and its immediate surrounding parts of the Cape Town CBD. (by author)

Urban Context Data:



Analysing the ownership of land in the city centre, it becomes apparent how much space the Cape Town Station and all its infrastructure occupy. The station occupies an area of 32-35 typical city blocks.

fig.35 - Land ownership diagram. (by author. Data source: City of Cape Town; satellite image source: Google Maps.)



Analysing the nature and network of public space in the inner city, it becomes apparent the large obstacle the Cape Town Station poses within this network.

The fact that the 'ramps and stairs' that would have led up and over the station platforms, broke the eastern part of the Cape Town CBD in half.

Also, in terms of free flowing urban pedestrian traffic, change in level via stairs is very inconvenient.

fig.36 - Public space diagram. (by author. satellite image source: Google Maps.)

Urban Context Data:

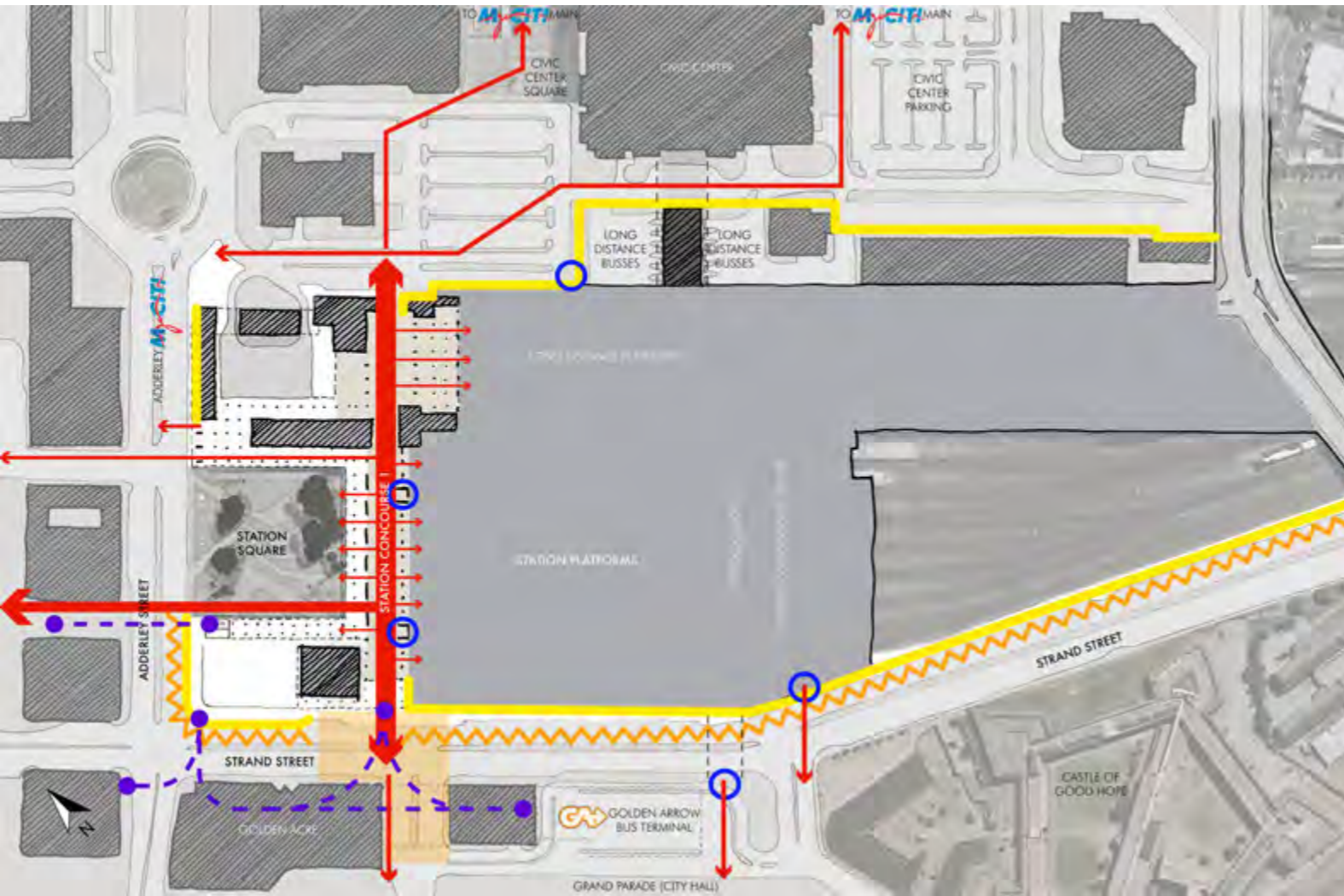
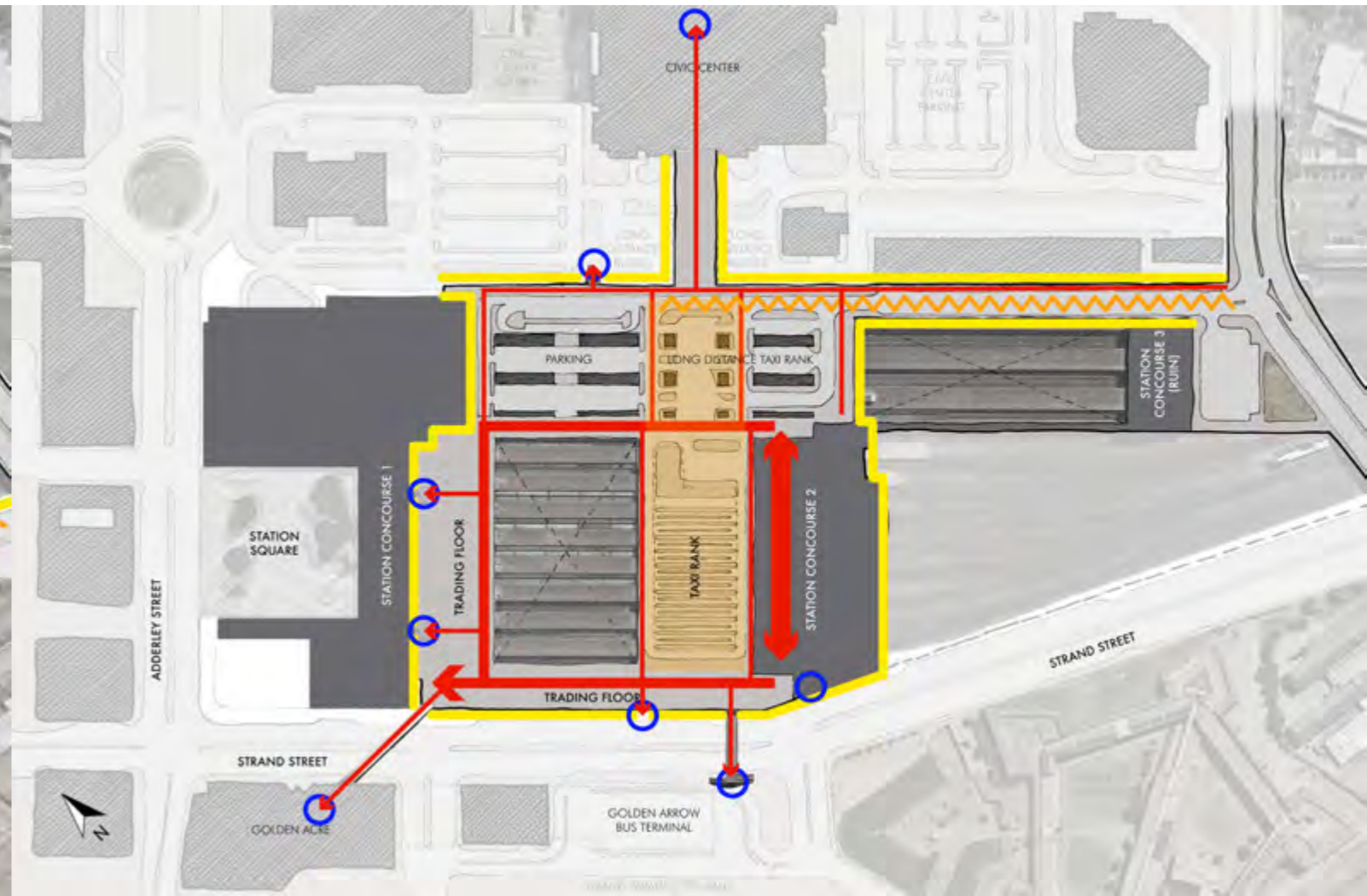


fig.37 - Movement diagram of Level 0 (street level). (by author. Satellite image source: Google Maps.)

These diagrams further illustrate the large scale disruption the Cape Town Station poses to the urban flow of the eastern part of the Cape Town city centre.

It also shows the complications posed by the bottleneck entrance to concourse 1 on Strand Street. This area is plagued by conflict between vehicular movement and the pedestrian axis used by all the passengers coming from the southern part of the city centre.



- Vertical circulation point
- Varying intensities of pedestrian movement
- Conflict between pedestrian movement and vehicular traffic
- Structural barrier line
- Barrier formed by road and vehicular movement
- Underground pedestrian links

Even if one should consider the taxi rank deck (and its vertical circulation access points) as a connection between the Grand Parade and the Foreshore, the taxi rank itself forms a conflict area between easy pedestrian movement and very congested vehicular movement.

fig.38 - Movement diagram of Level 1 (taxi rank level). (by author. Satellite image source: Google Maps.)

Typological classification of the Cape Town Station

This typological classification is based on prior research done (Appendix B). The overall classifications can be reduced to: **Functional Typology**; **Typologies with relation to urban environment and traffic volume**; and **Typologies in relation to their placement within a railway network**. These conditions create specific arrangements of platforms, concourse and passenger movement. In order to follow the design philosophy established in PART THREE, the typology of the Cape Town Station has to be understood.

Starting at the very basic, the Cape Town station can be as a **Passenger Station**. This brings about a collection of system and infrastructure requirements for the workings of the infrastructure as well as the safety and comfort of the passengers that use the station. (Appendix C)

Furthermore the Cape Town Station is a **City Centre Terminal** and the **Main Station** for the railway network of the Cape. This means that the station is located in the central/most prominent/most important district of an urban environment.

The Cape Town Station is also an **Interchange Station**. It serves as a link to a number of other modes of transport, both within the station itself as well as in its immediate surroundings. This usually results in a layering of modes, as is evident in the minibus taxi rank being located above the platforms of the railway station.

The three classifications above together as a combination classifies the Cape Town Station as a **Terminal**. This is the station at the beginning/end of a railway line. Mostly these stations occur in large cities that form important nodes within a large national network. These stations also function as gateways to the city. Terminal stations mostly have other modes of transport overlaid within them, or near them to facilitate a transfer and freedom of movement.



Due to the social conditions of Apartheid, the Station was initially designed with two separate public concourses. One for white passengers, and the other for non-white passengers. These two concourses are somewhat sub-typological arrangements with the formally white-only station being a 'Terminal' typology (fig. 39 + 42), and the formally non-white station imitating a 'Through Station' which is usually placed alongside and over the tracks. (fig. 40 + 43)

These two concourses are now referred to as Concourse 1 and Concourse 2. The latter of which was recently renovated (2014) and upgraded as a general part of the overall station.

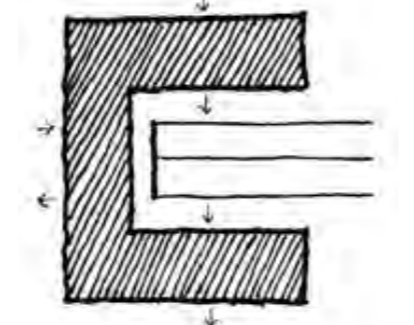


fig.39 - Terminal Station Typology Diagram. (by author)



above - fig.40 - Through Station Typology Diagram. (by author)

left - fig.41 - Concourse two: Through station typology, above tracks with access to platforms from above. (by author)

fig.42 - The concourse 1 and the surrounding services and commercial elements (red) express the typical Typology of a Terminal Station. In a C-shape around the terminating train lines and platforms. (light blue).

The turquoise elements and the connection indicators show the interchangeability between modes of public transport, such as the MyCity stations, as well as the Golden Arrow, and the Taxi Rank on Level 01.

(by author)

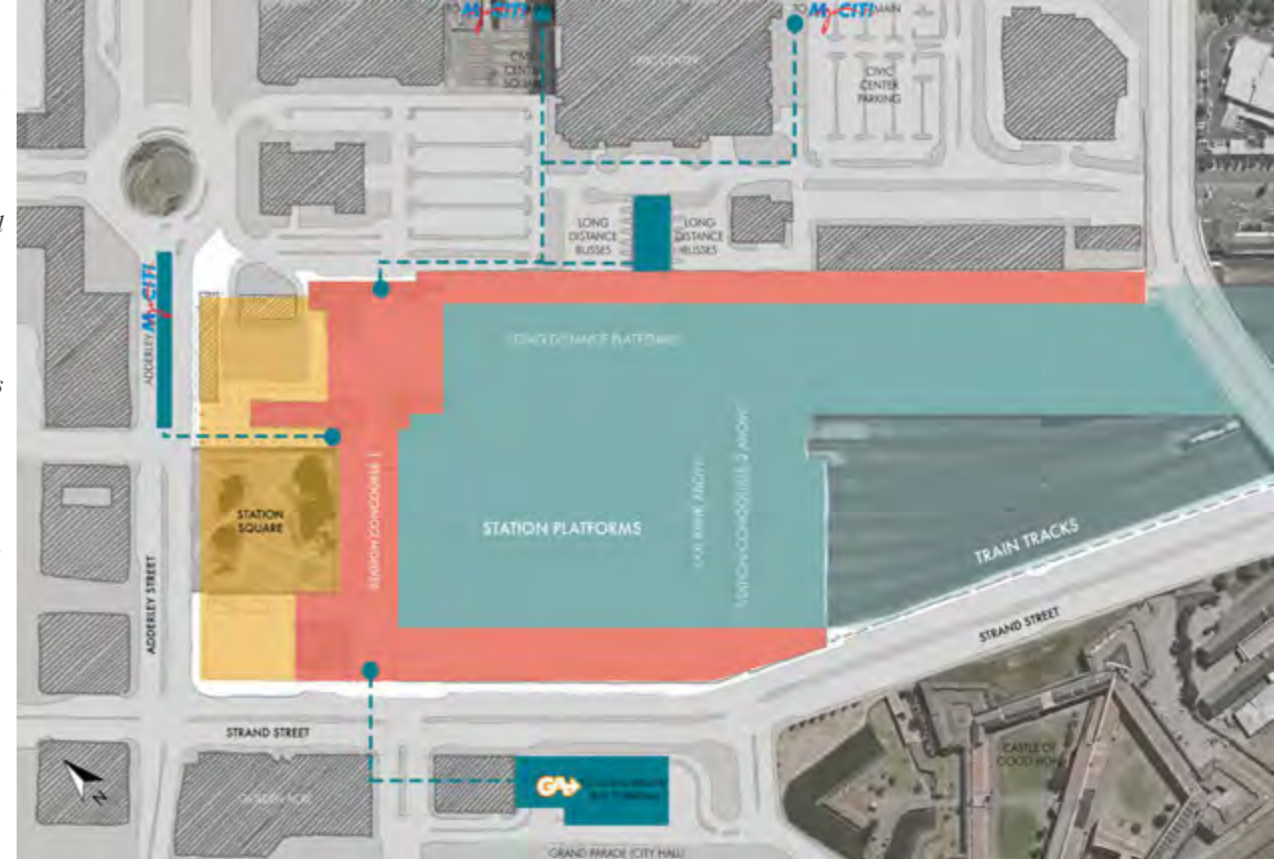
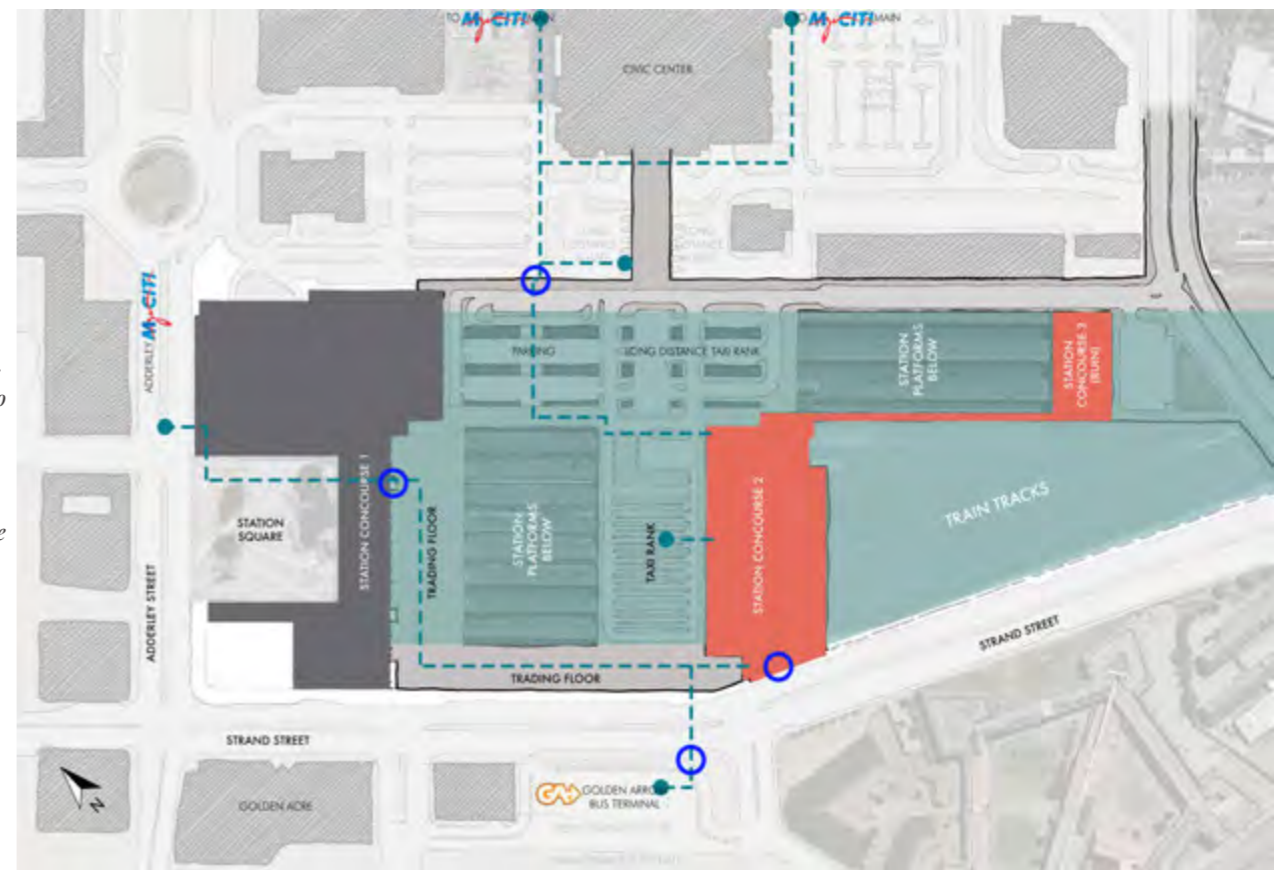


fig.43 - The newly renovated concourse 2 (red) and its connected long distance concourse (now a ruin) is on Level 1, and therefore above the train lines and platforms (light blue). This has the effect that it arranges itself as a typical Through Station Typology. The access to the platforms is from within, down to level 0.

The blue circles indicate vertical circulation to Level 0, and the turquoise connectors indicate links to other modes of transport.

(by author)



PART

SIX

DESIGN INTERVENTION

The Concept

This collage expresses, in abstract form, the design philosophy from PART THREE applied to the Cape Town Station.

It aims to express the basic elements of infrastructure such as the Taxi Rank and the Railway Platforms, as layers, into which programs have been injected.

These programmatic injections can have different effects, such as strengthening an urban axis, linking different modes of transport with each other, expose different cultural narratives to one another, or provide a platform for social evolution.

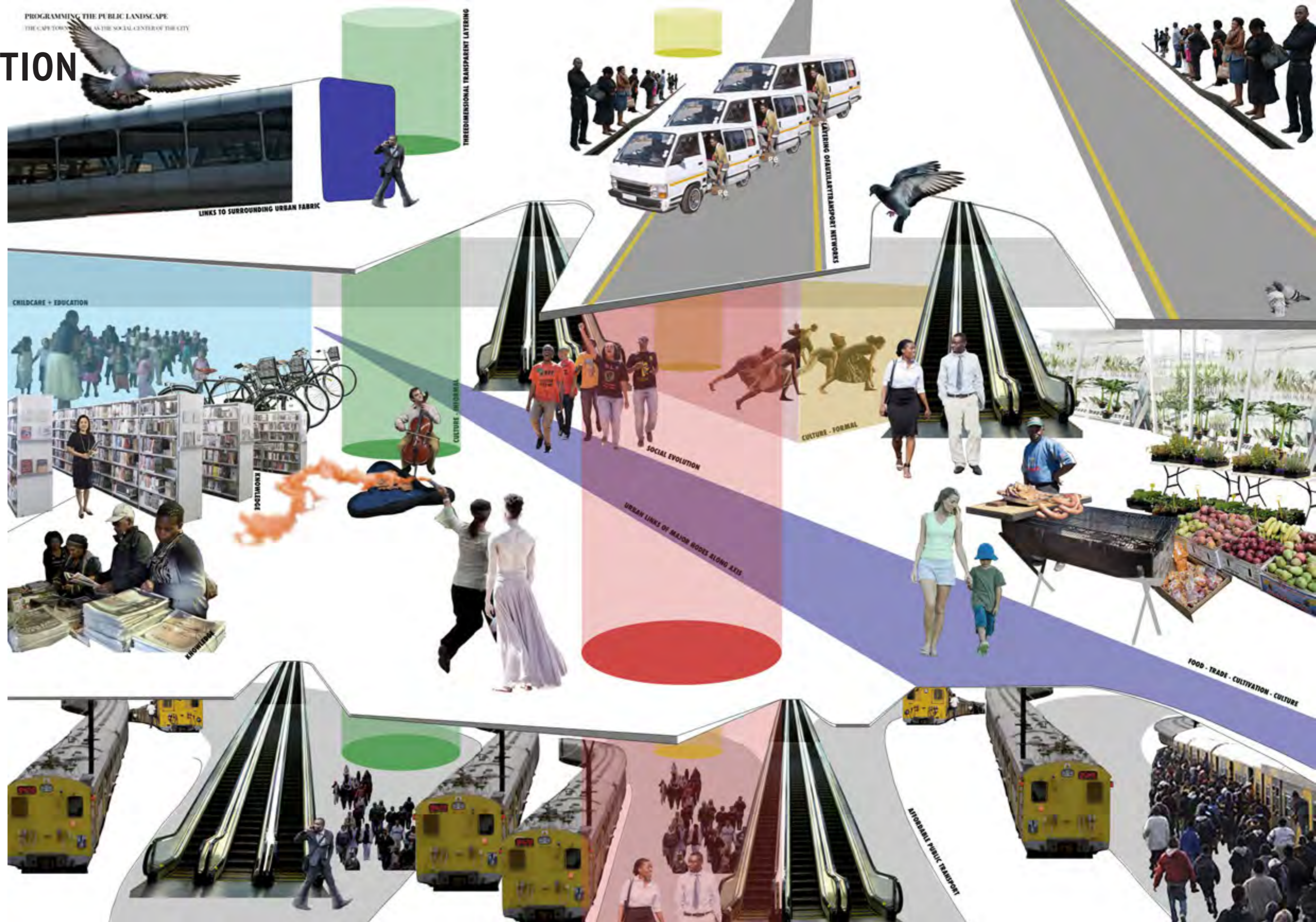


fig.44 - Abstract Concept Collage (by author)

The Sequence of Intervention:

The idea is to approach the issue from three simultaneous point of views. One is relieving the Cape Town Station of urban pressure points, urban barriers and bottlenecks to improve its use and reconnect it to more of it's surrounding context (Diagram 2+3). Secondly, focus will be placed to introduce symbolic spatial conditions that undo remnants of the apartheid principles of racial segregation that were applied to the design of the railway station complex. And last but not least its typology of a 'gateway to the city' will be re-designed by sensitively programming it with a selection of cultural cornerstone programmes with the objective in mind to create a space that facilitates a cultural evolution. (Diagram 4)

1

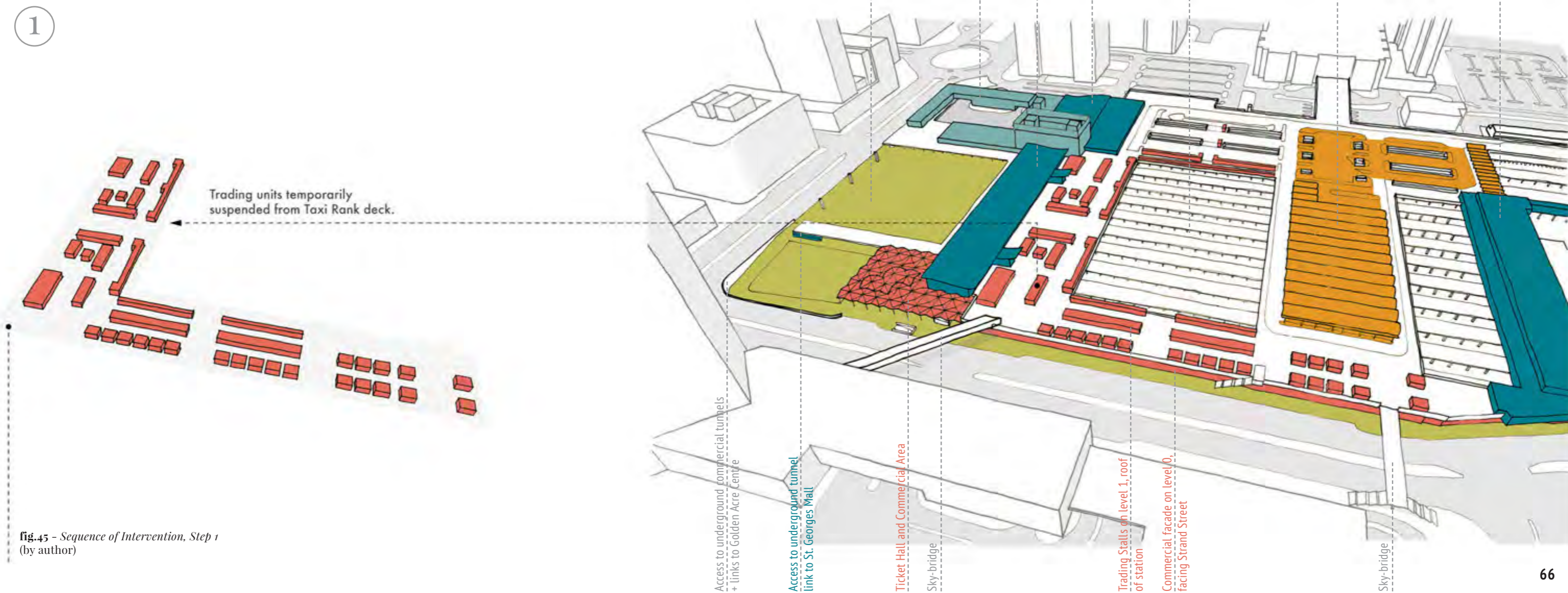
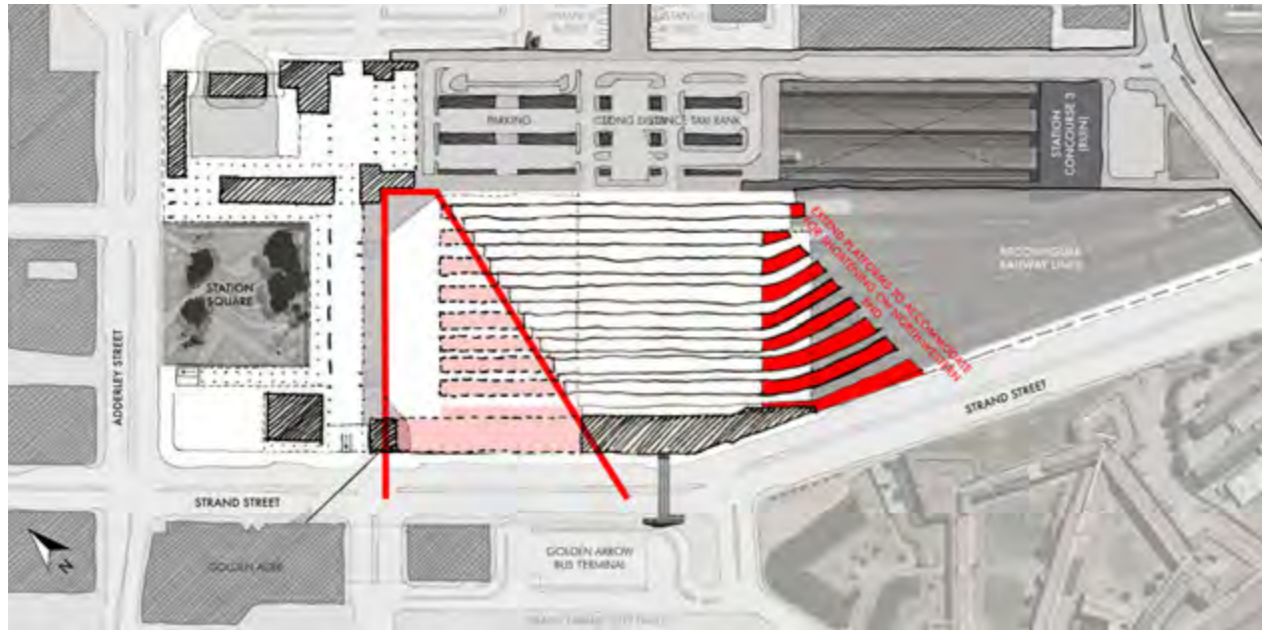
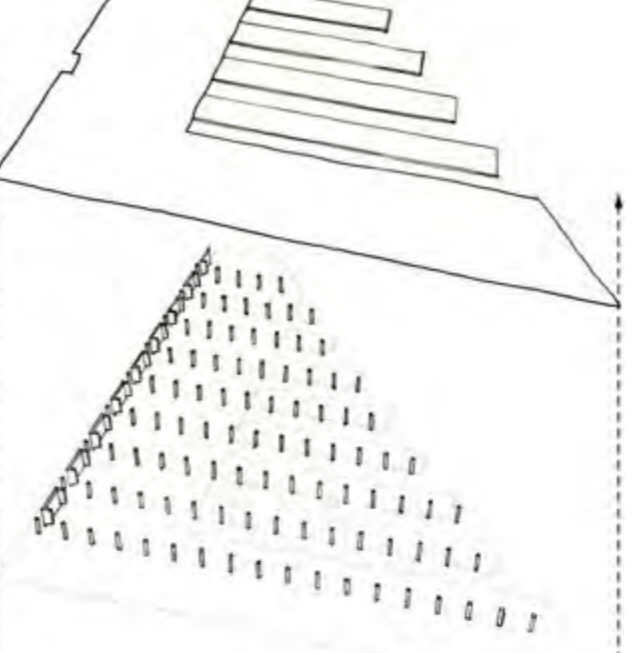


fig.45 - Sequence of Intervention, Step 1
(by author)

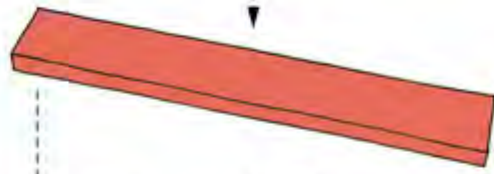


2

Wedge section of Taxi Rank deck to be removed, along with supporting column grid.



Indicated section of commercial + station services to be removed.



functions contained in this section to be portioned.

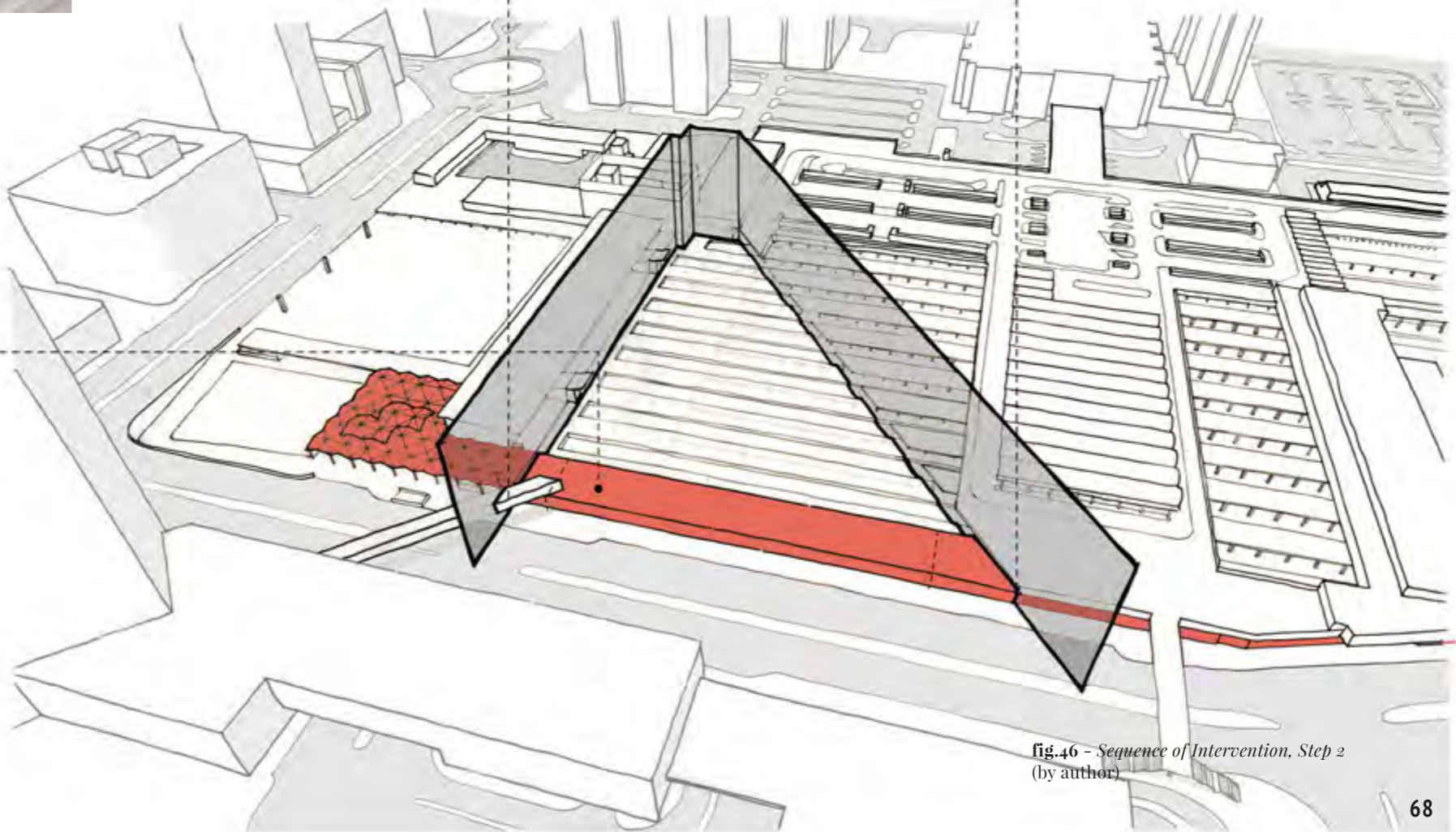
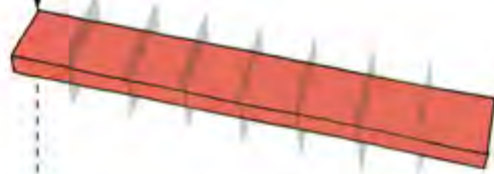
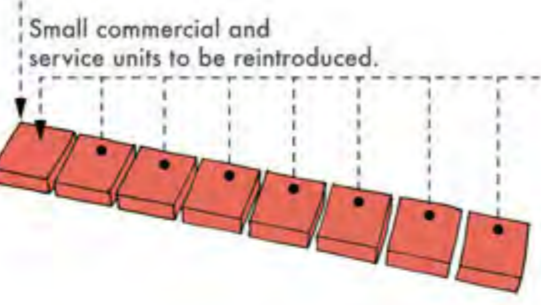


fig.46 - Sequence of Intervention, Step 2 (by author)

3



Commercial and service units to be distributed as shown, this creates a new public space area.

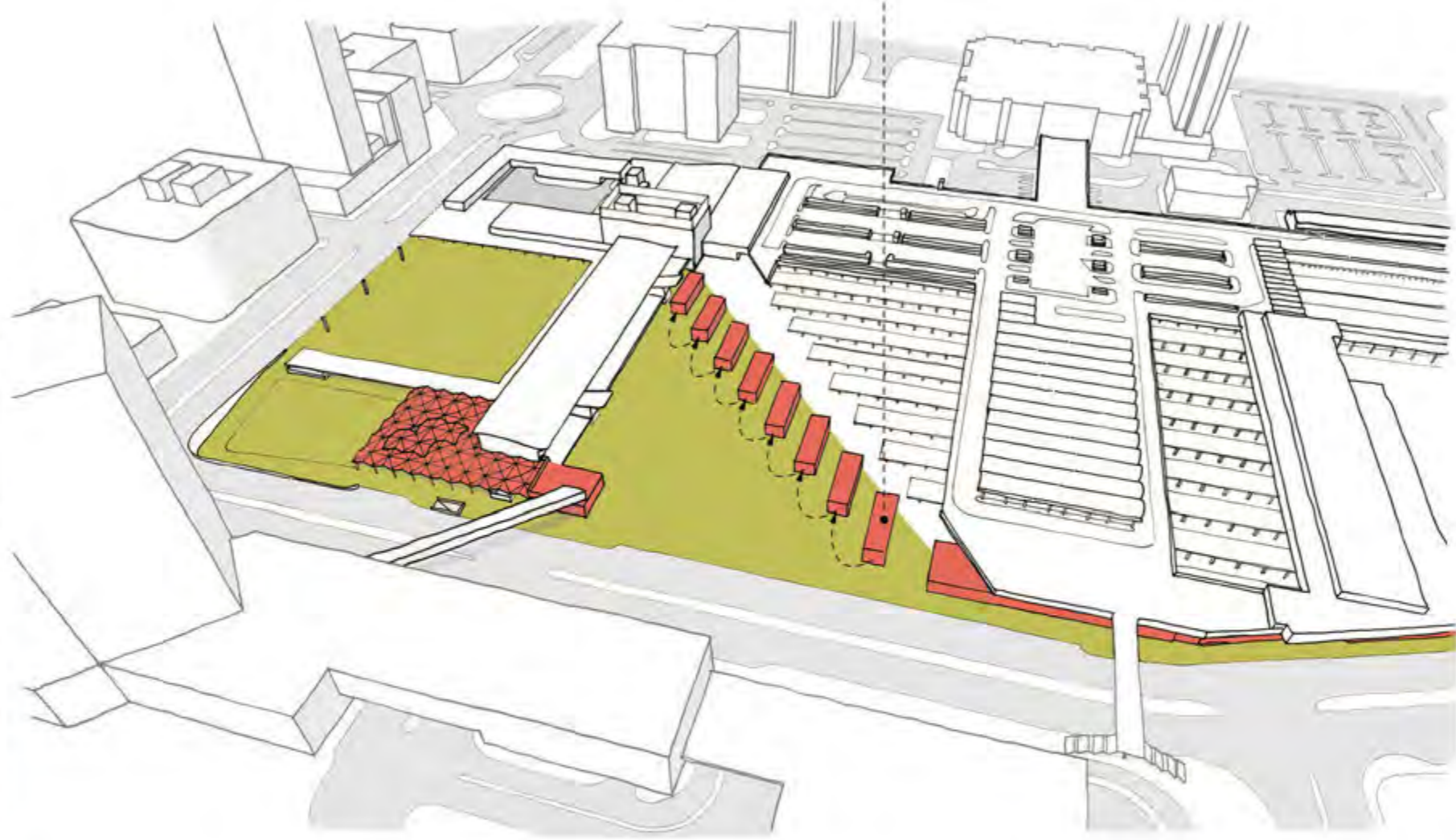
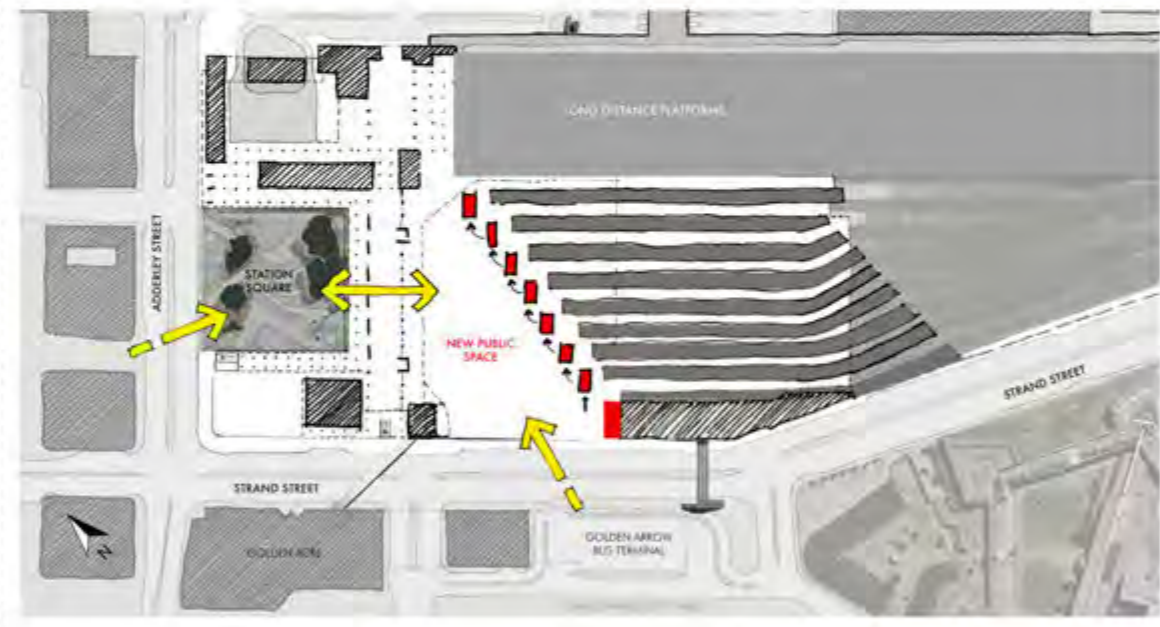


fig.47 - Sequence of Intervention, Step 3
(by author)

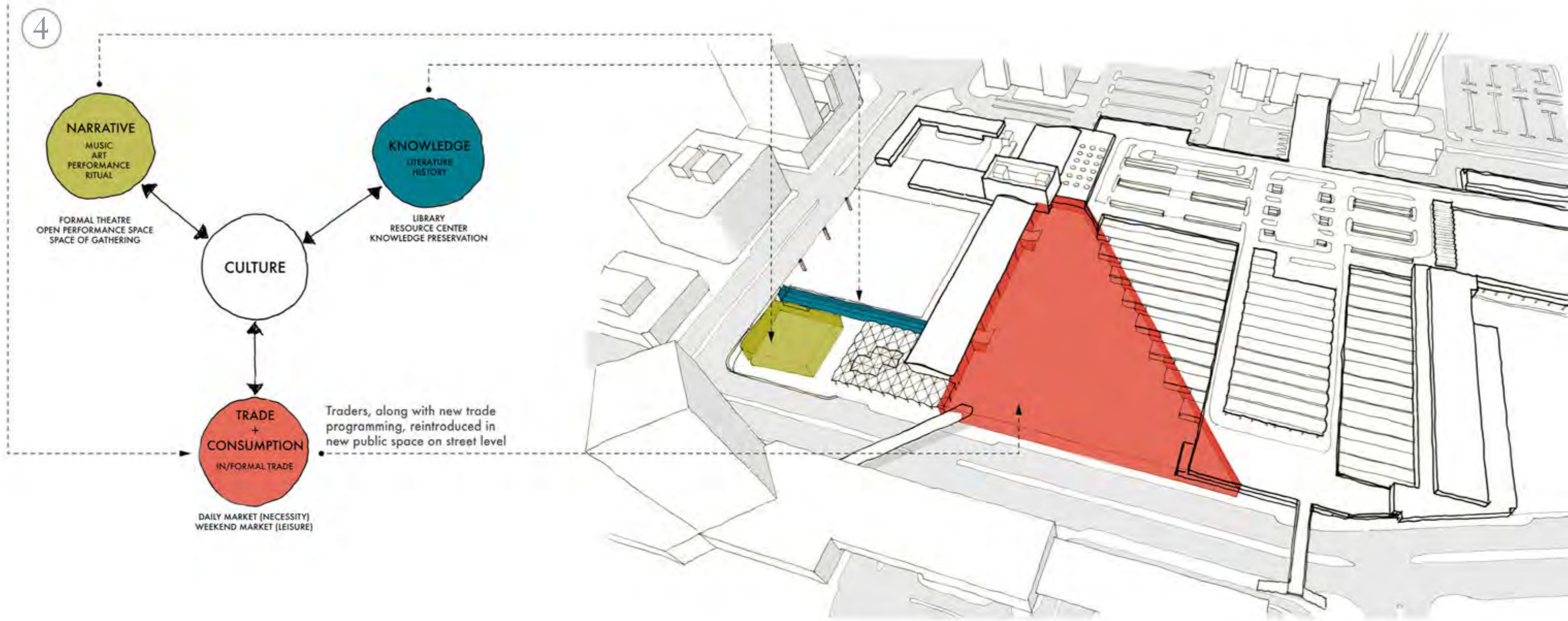
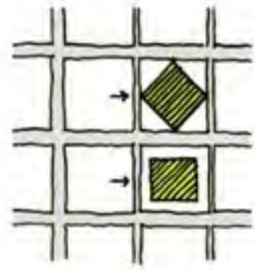


fig.48 - Sequence of Intervention, Step 4
(by author)

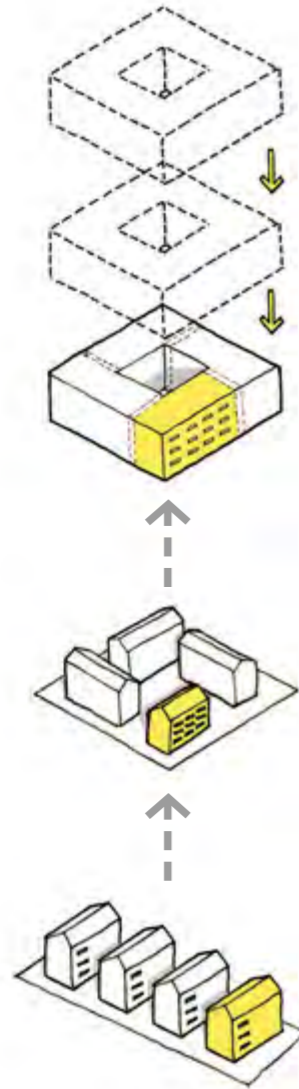
5



A high-rise residential tower is added at the tip of the trade triangle, it forms the knuckle at the turning point of the newly formed pedestrian axis.

The Cape Town city grid is not aligned with the climatic conditions of the area (see diagram above). Buildings face morning and afternoon sun with all elevations, and they also face the strong south easter and north wester wind head on. Therefore the orientation of the building is diagonal to the city grid. This orientation also supports flow of people into the station.

The concept for the floors is derived from taking a row of walk-up three storey buildings in a linear arrangement, re-arranging them in a courtyard, and then transforming this into a cell, which can be stacked on top of another (see diagram on the right). This brings



down the scale of the communities within the building and thus supports a smaller communal engagement amongst tenants.

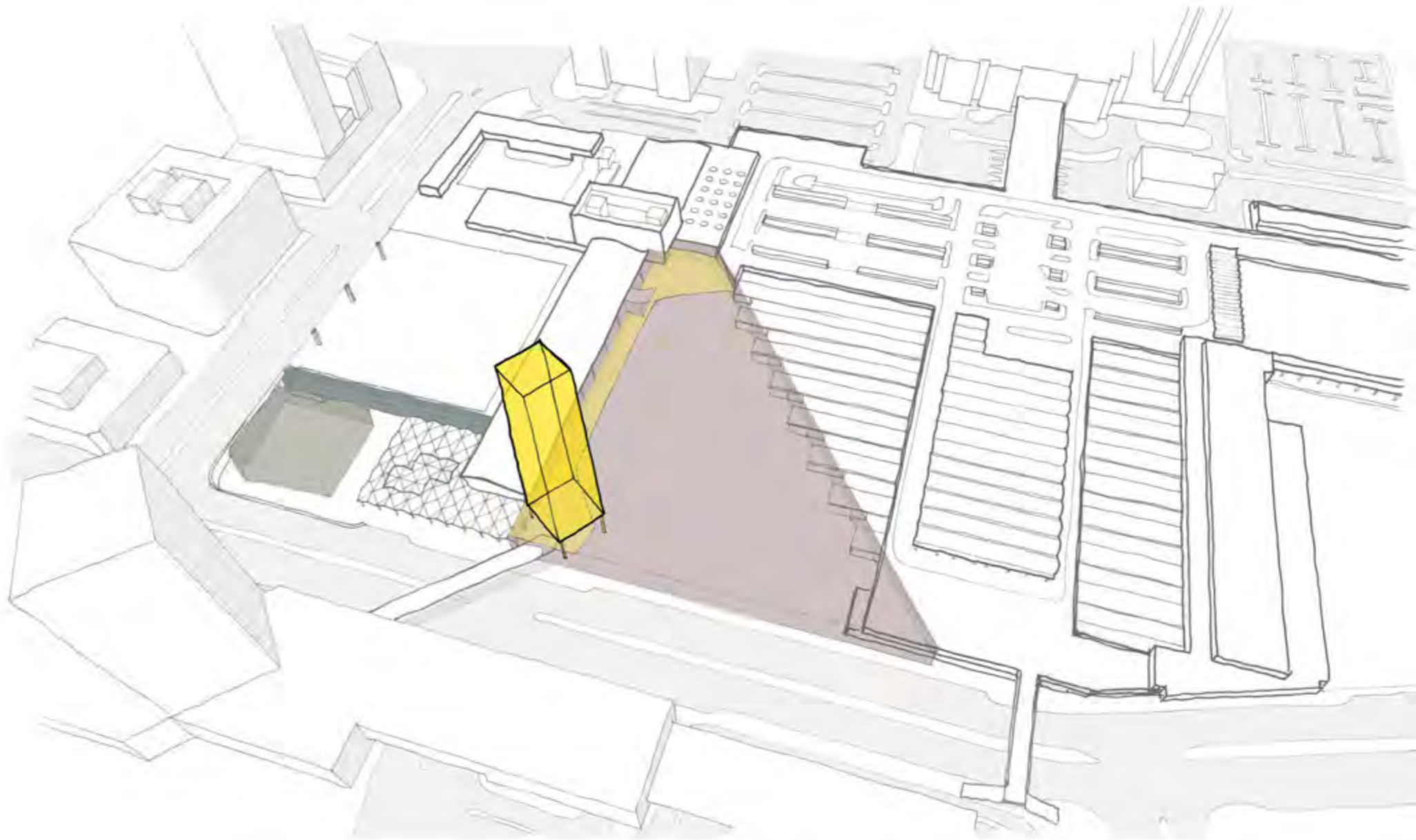
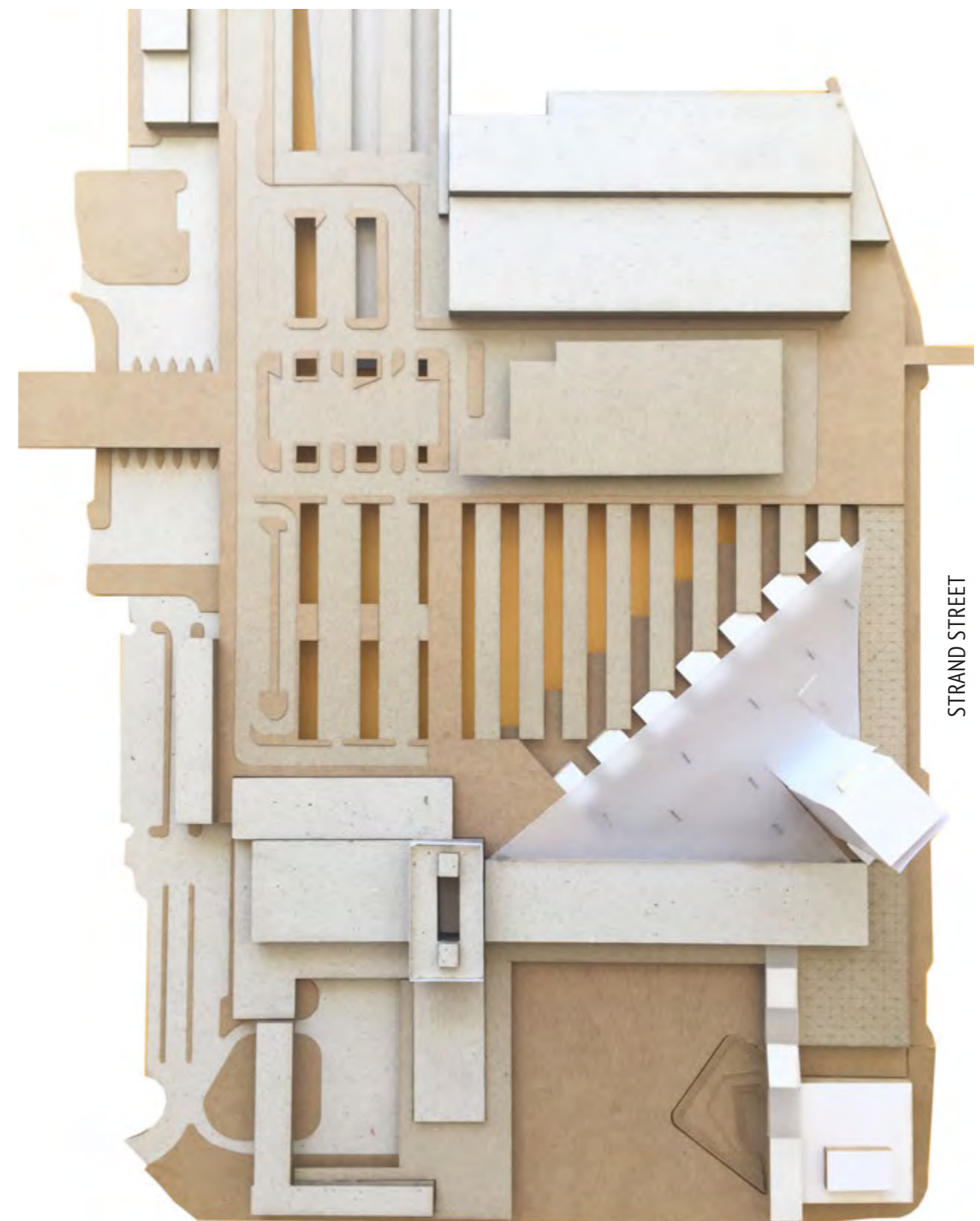


fig.49 - Sequence of Intervention, Step 5 (by author)

This **massing model** shows the existing station and the three dimensional intervention.

The four elements of programmatic injection are shown and how they engage with each other, as well as the structure of the typology of the station.

fig.50-55 - *Photographs of massing model* (by author)



The Programmatic Interventions:

fig.56 - Programming diagram
(by author)

NARRATIVE

MUSIC
ART
PERFORMANCE
RITUAL

All people tell stories. Whether it is through words, music, art or performance, we express our life's narrative. And also merely through living out our lives, being a body in space, we tell stories.

As humans, we observe stories the people around us tell us. Whether directly through interaction, or indirectly through observation.

This programmatic injection bases itself on this aspect. The slope on the corner of Strand and Adderley is programmed as a formal theatre, which spills into the station square as an amphitheatre for a blend of formal and informal story telling. And lastly, the remaining station square is programmed with urban objects, that allow the expression and observation of the narrative of every day life.

This has the aim to be a platform for all forms of narratives to coexist.

LIFE = PLAY = LIFE = PERFORMANCE

'Humans are a story-telling species. Faced with a multiplicity of facts and ideas which we may only imperfectly understand, we use stories to create frameworks that help us to transmit the sense of what we understand to other people. Our culture is contained within the stories we tell. The thing which humans need more than comfort, more than possessions, more than sex or a settled home, is a good supply of stories, for it's through stories we make sense of the world.' (Abbott, 2012)

STRAND STREET

ADDERLEY STREET

new knowledge.

fig.57 - Programming diagram
(by author)

KNOWLEDGE

LITERATURE
HISTORY
IDEA DEVELOPMENT

Libraries are machines for the 'upliftment and enlightenment' of the public. They should be viewed as a network of 'integrated, mutually reinforcing, evolving infrastructures'. We should think of libraries as open platforms - not only for the development of knowledge and community. (Mattern, 2014)

The library system across the city of Cape Town is vast. Local libraries exist in almost all areas. The central library is next to City Hall on Darling street. It provides services common to libraries such as book loans, literature classes, job seeking assistance etc.

Therefore this Knowledge and Idea centre does not aim to replace any of the existing services, but rather evolves the system to gain services that are in line with advancement in Information Technology and other social needs. The variety in how to access information has grown and our library system has to be updated to incorporate new ways of accessing, storing, and creating

This Knowledge and Idea Centre is aimed at doing just that, within the multifaceted narrative of the South African context.

The library will place itself onto the roof of the walkway, lifting it off of the ground, creating a more buffered interface with the station.

It will be programmed to have an element that is a 'loud' library which is aimed at exchange, and also assisted digital access/ development of knowledge. It will also have a workshop area with 3D printers etc. for people to develop patents, and other products they have invented.

It will also have a traditional 'quiet' library as a book stack, which will house South African literature and other forms of unconventional artefacts that contain the narrative of our cultures. These two library spaces are separated by an auditorium, which will be used for lectures, readings and seminars.

This Knowledge centre serves as the access point to the library system in the city, and also serves as a space for memory and knowledge of all layers of South Africa's society to be housed under one roof.

STRAND STREET

ADDERLEY STREET

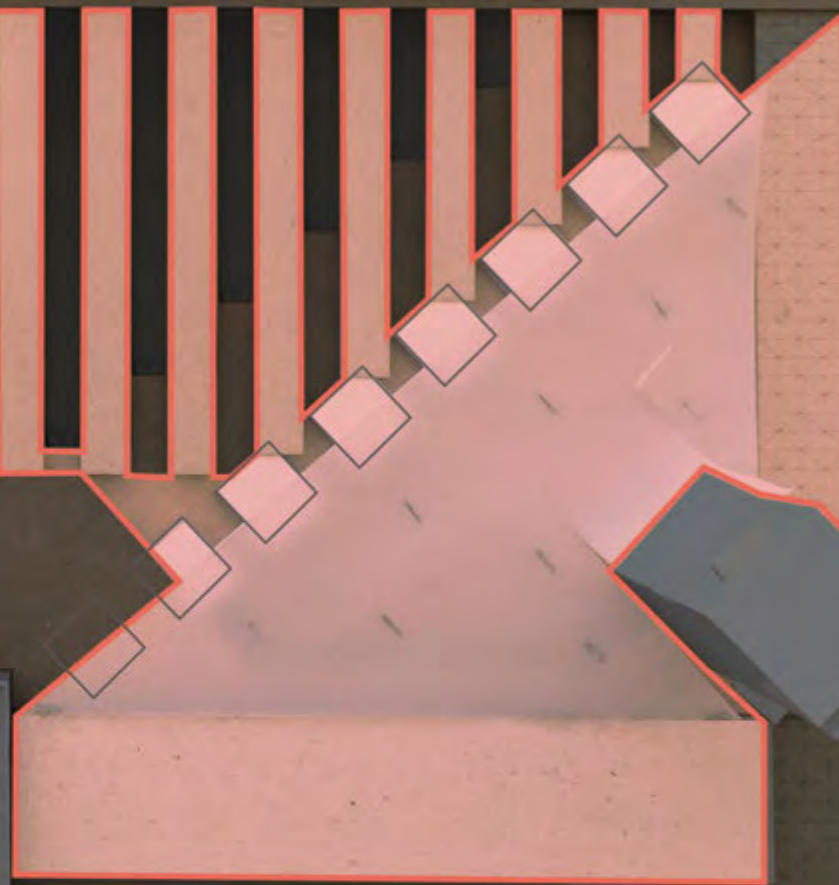
fig.58 - Programming diagram
(by author)

**TRADE
+ CONSUMPTION**
IN/FORMAL TRADE
FOOD PRODUCTION
EXCHANGE OF SKILL

Another cultural aspect that all fragments of society share is the trade, production and consumption of goods. This programmatic injection provides the platform for these different fragments to share the same space.

The new triangle is a marketplace, in which the trading units, which formerly were housed on the taxi rank deck, will be placed. These units represent the daily in/formal trade that is happening in our urban environments. This program is extended by providing space for 'weekend/holiday/occasional craft and goods' markets to be held. These markets usually serve separate fragments of society as the former is usually associated with livelihood, and the latter with leisure. They can now coexist in the same space and vendors and customers can be exposed to each other's products, crafts and cultures of trade, food and socialising.

The injection of the market triangle has moved the function of the



modernist concourse hall. This hall is now a 'self programming space' which can house gatherings, markets, festivals etc.

The programme of product production is represented as new hydroponic greenhouses that will place themselves on the roofs of the station platforms. This will bring the functions of trading and production into the same space.

The market triangle is covered with a large scale roof.

STRAND STREET

ADDERLEY STREET

fig.59 - Programming diagram
(by author)

**MIXED INCOME
HIGH DENSITY
RESIDENTIAL**

From studying the Cape Town Station in terms of its relationship with its surrounding context in terms of density and height, it is a strong indicator that the site needs to be utilised much more for the sake of density and economic use of limited space in the city.

In terms of high-rise developments though, the city centre is saturated with high-rise commercial space such as offices. The rate of unoccupied office space in the CBD has been slowly rising for the last three years. (Colliers, 2014)

However, the City of Cape Town has marked an area along major routes and centres as Urban Development Zones (UDZ). These zones are subject to special policies that grant developers special tax deductions for different types of development. Low cost high density housing is categorised with the highest rate of 25% tax deductions over 11 years.

The Cape Town Station falls into the UDZ.

Furthermore, the *daily life* of the station precinct is very limited to hours of operation and on weekends the area is extremely quiet and under-utilized.

This makes a high-rise residential development in this area very feasible.

However, for the sake of the philosophy of egalitarian programming; a goal of coexistence; as well as accessibility to affordable housing in City Centres; research was done into the concept of **mixed income high-rise developments**.

Precedents in New York City show the model of a blended complex, comprising of subsidised social housing units and market rate private residential housing, to be very successful.

Of course this will require a shift in mind-set and a change in policy on a municipal level, however this high-rise residential building can be viewed as a pilot project for a new concept of blended housing in the inner city.

A residential complex within the Cape Town Station precinct will extend the *lively hours* of the day to 24 hours, as well as 7 days a week.



STRAND STREET

ADDERLEY STREET

Design Development:

MAINTAINING COHERENCE:

The biggest architectural challenge for this project is maintaining coherence throughout a public place complex that is continuously becoming more complex.

Multiple programmes, on many levels and scales, make the design as a whole so complex that it is at risk of appearing as a collection of oddities, a *salad* of unrelated objects. This issue makes it crucial that the architecture is unified and coherent.

One way to do this is to cover everything with a big roof and a facade enclosing it all, creating a sole image. This is not feasible in this project for multiple reasons. Therefore the design had to follow a different strategy.

The roof of the existing ticketing hall and restaurant has a distinct character (see fig 60). This language was selected and applied to multiple elements throughout the design: **Roofs, pergolas, shading devices, ceilings, as well as façades.** (fig. 61) Important to note here is that the element was not merely replicated, but in each instance its composition, tectonic and scale was altered to serve specific purposes of the programmes it applies to. The only thing that remains are the proportions. All elements are in harmony with one another.

The diagram below aims to show how the same language folds itself through the whole design.

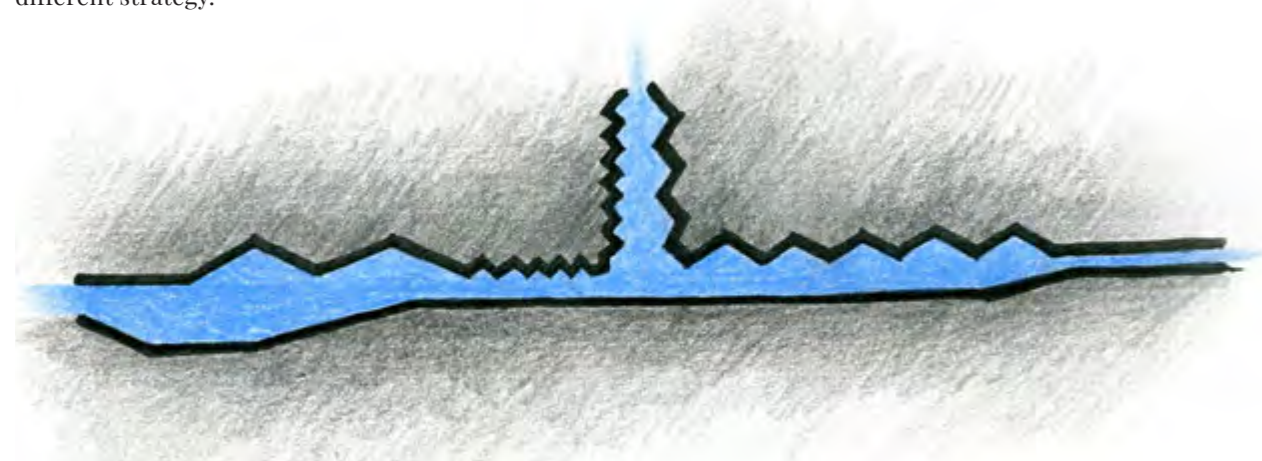


fig.61 - Concept Diagram - Coherence (by author)



fig.60 - The existing roof over Ticket Hall on Strand Street. (source: Google Street View)

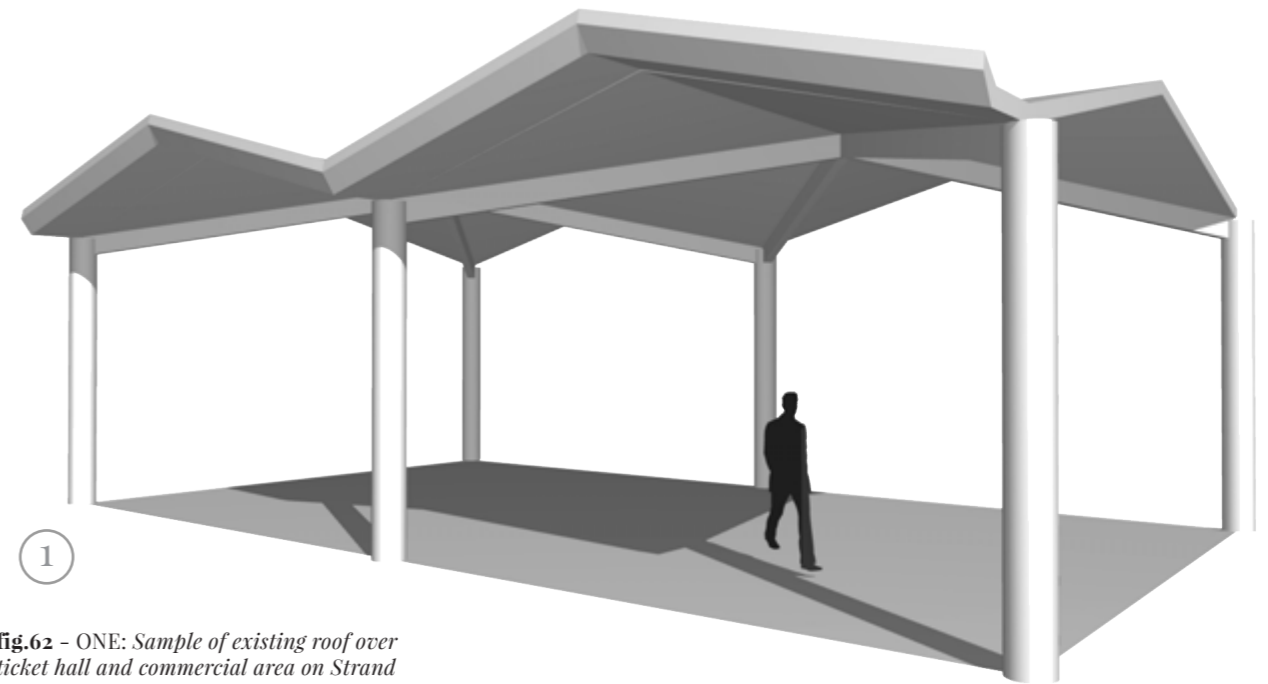


fig.62 - ONE: Sample of existing roof over ticket hall and commercial area on Strand Street. (by author)

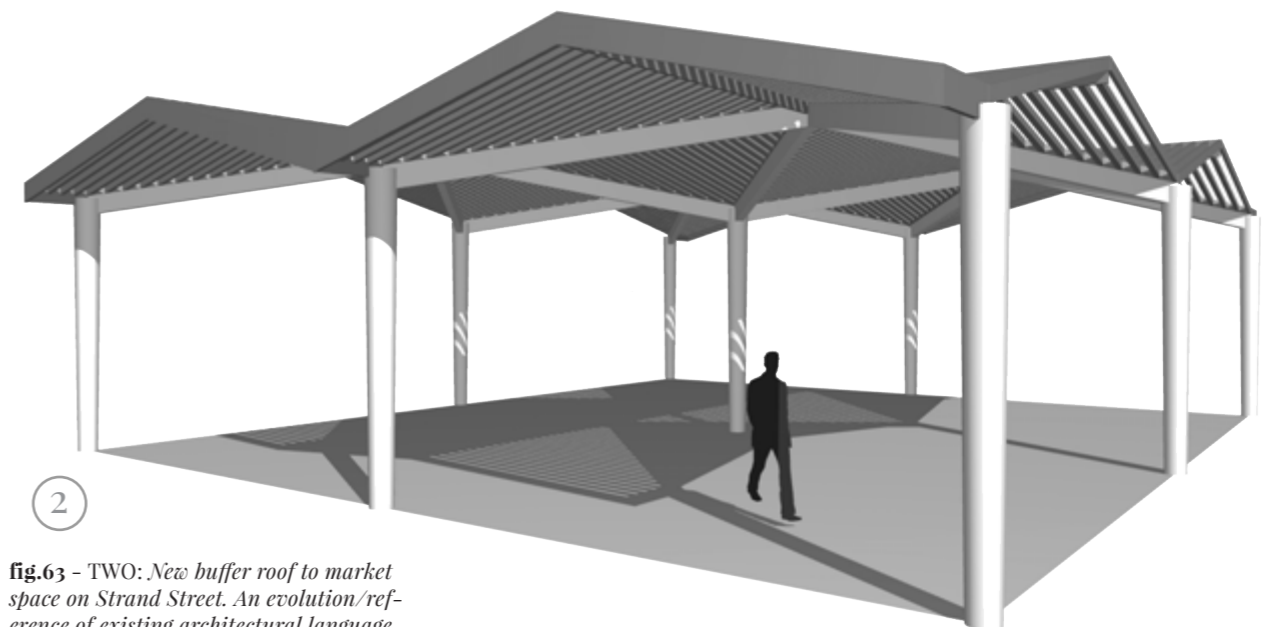


fig.63 - TWO: New buffer roof to market space on Strand Street. An evolution/reference of existing architectural language (by author)

fig.64 - THREE: The roof of the library references the same geometry in its ceiling, yet due to the increase in scale the tectonic and the structure is adjusted to steel structure and aluminium loured ceiling. (by author)

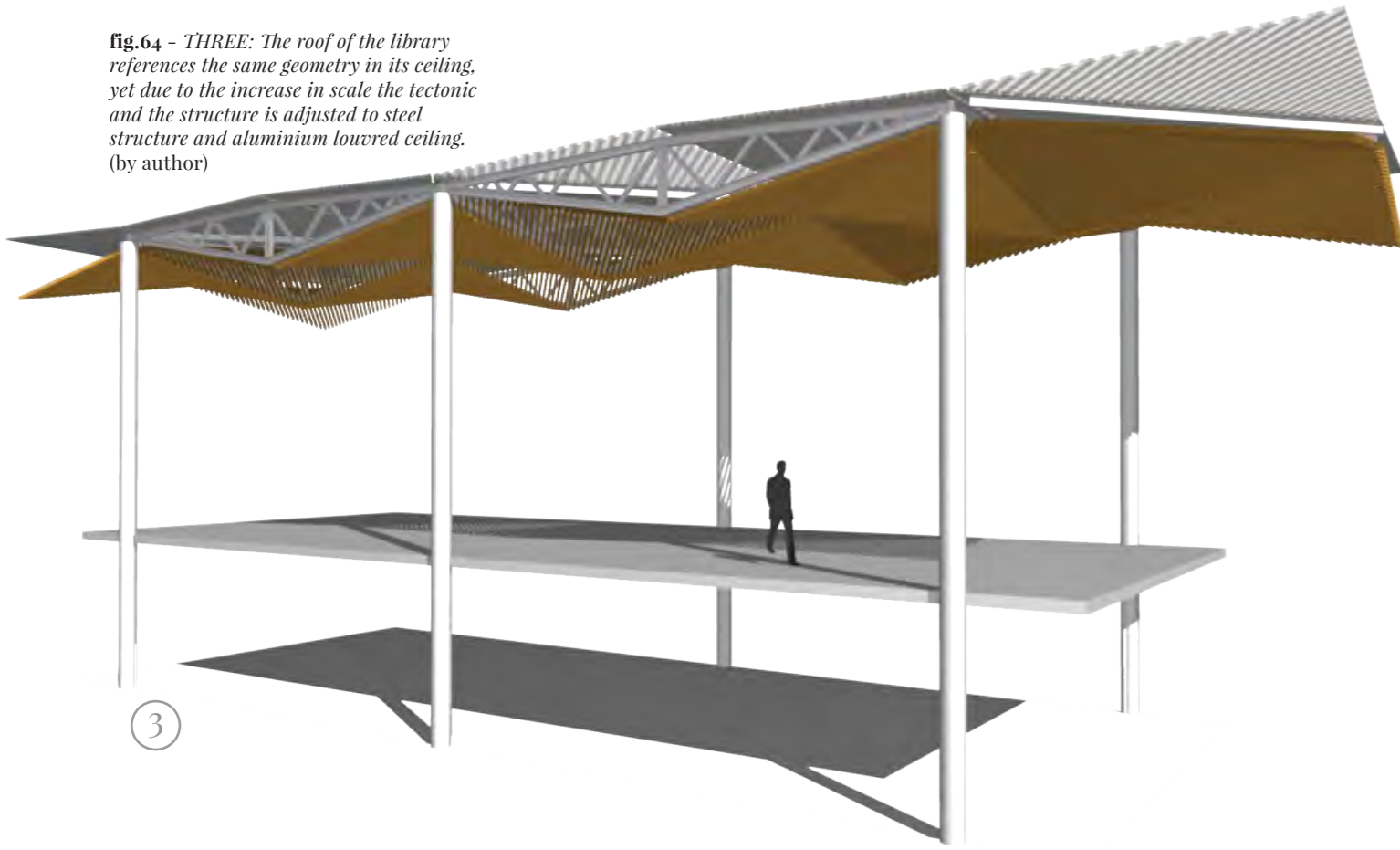


fig.65 - FOUR: The roof of the market place is required to have large spans to allow for as much unobstructed floor area as possible. The height also accommodates for both levels, Level 0 and Level 1. The same tectonic and structural changes apply as for the library roof. (by author)

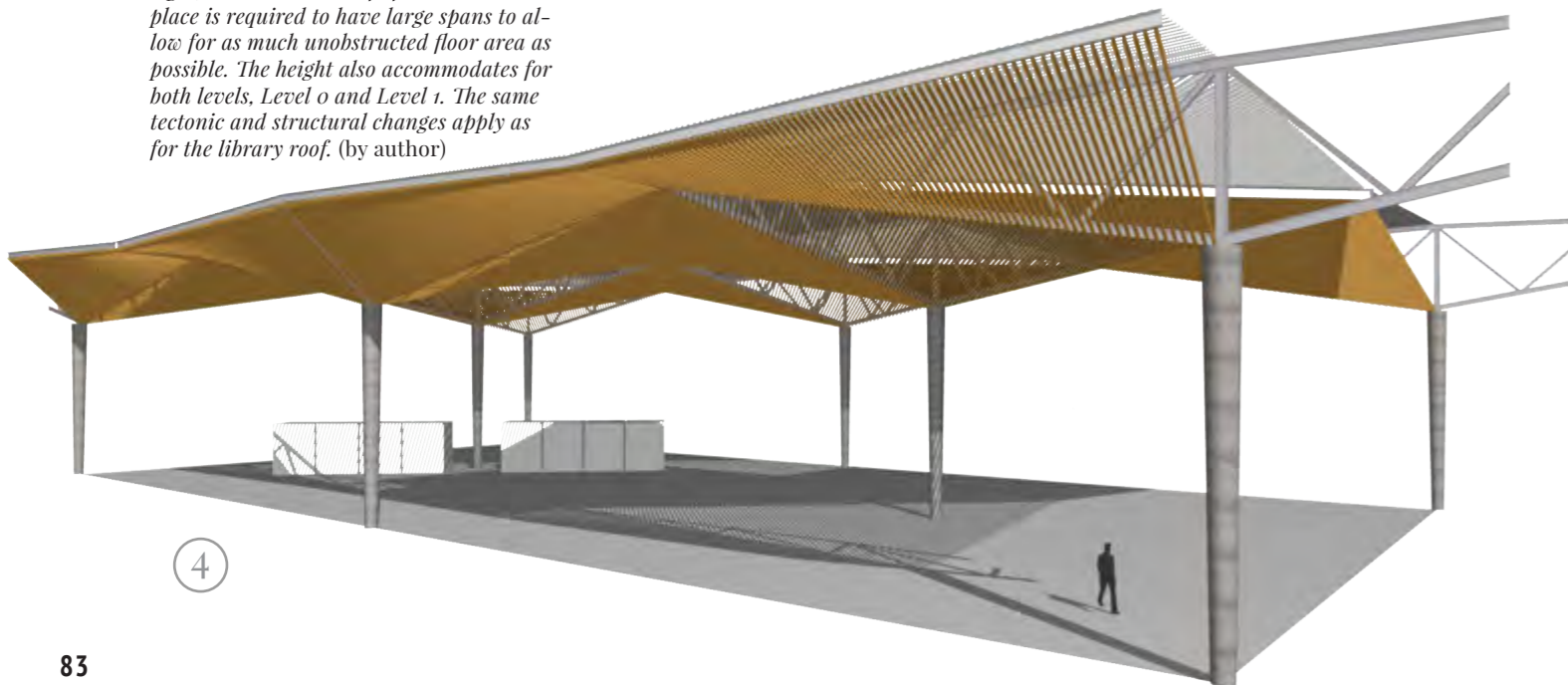
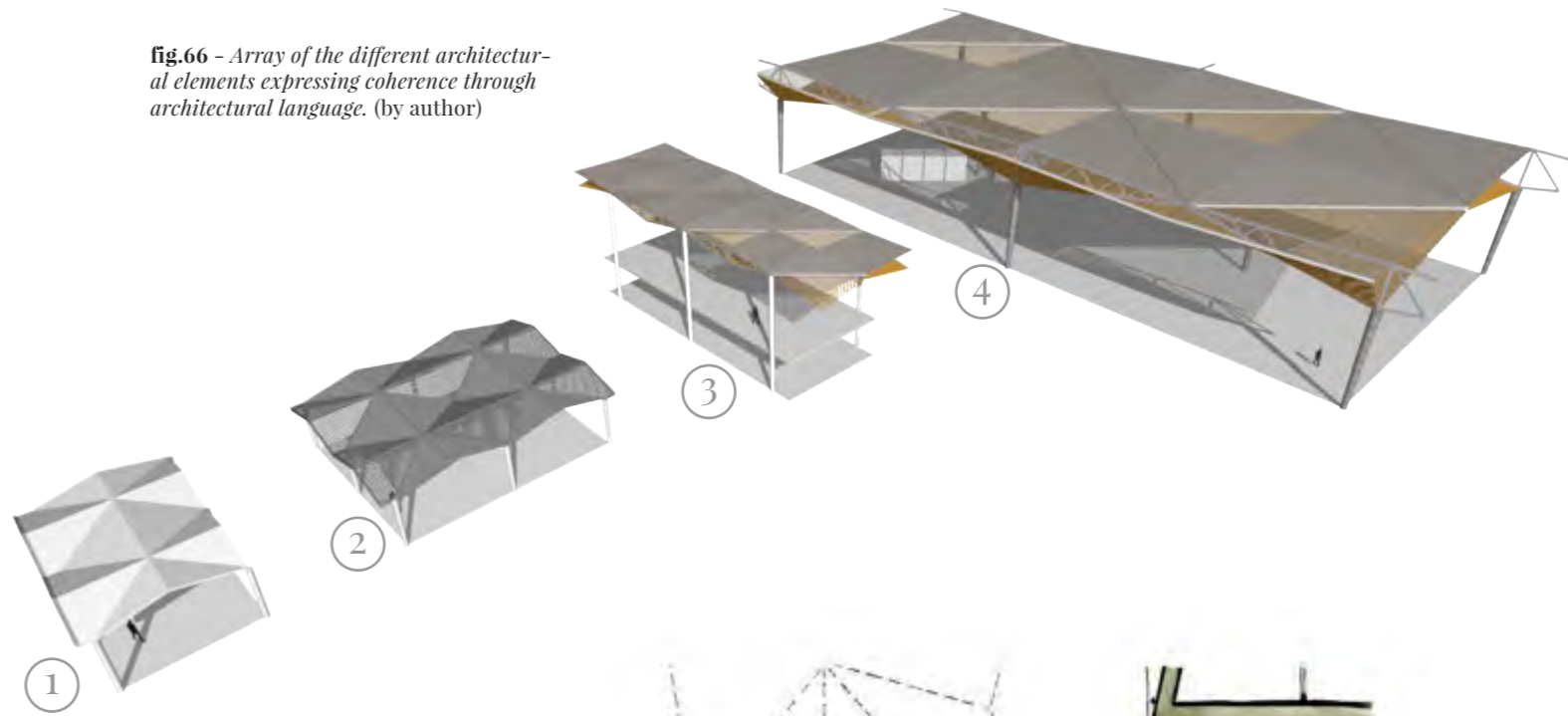


fig.66 - Array of the different architectural elements expressing coherence through architectural language. (by author)



Coherence is achieved through harmony in material, geometry and language.

This in essence is perhaps a metaphor for the ambition of creating a harmonic space of coexistence in a multifaceted social environment.

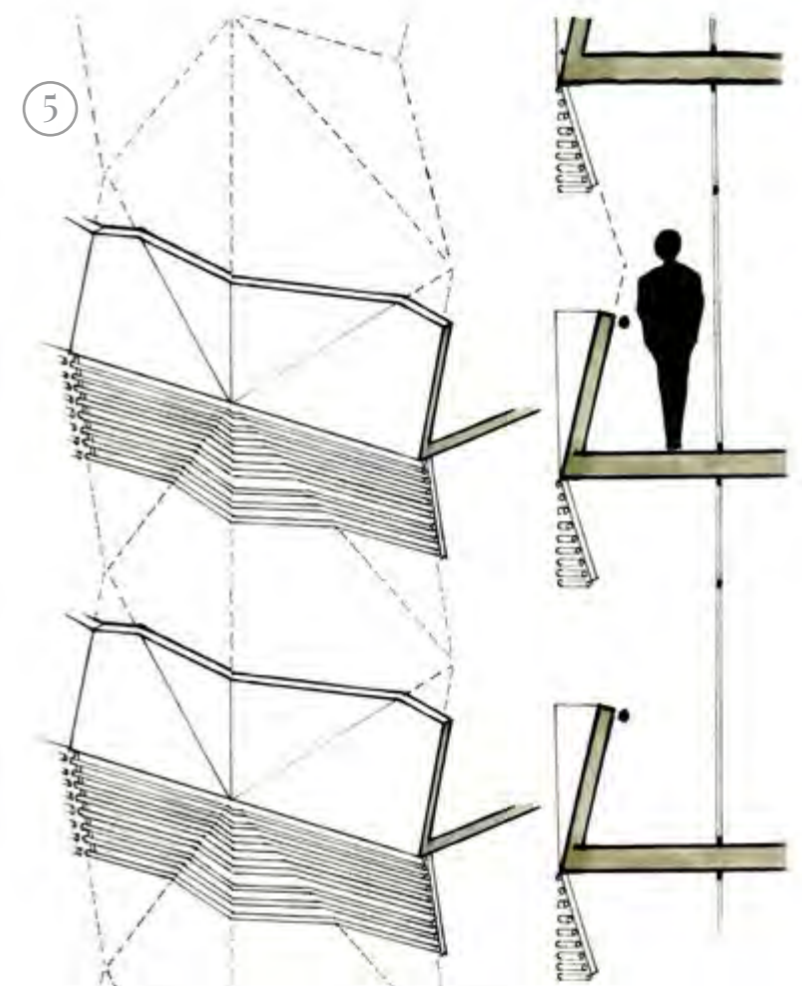


fig.67 - Facade detail showing evolution of the original roof configuration into the facade of the high-rise residential building (by author)

MAINTAINING LEGIBILITY:

Due to the fact that this project is making the function/layout of the station considerably more complex, another architectural challenge is how to maintain a legibility of the building.

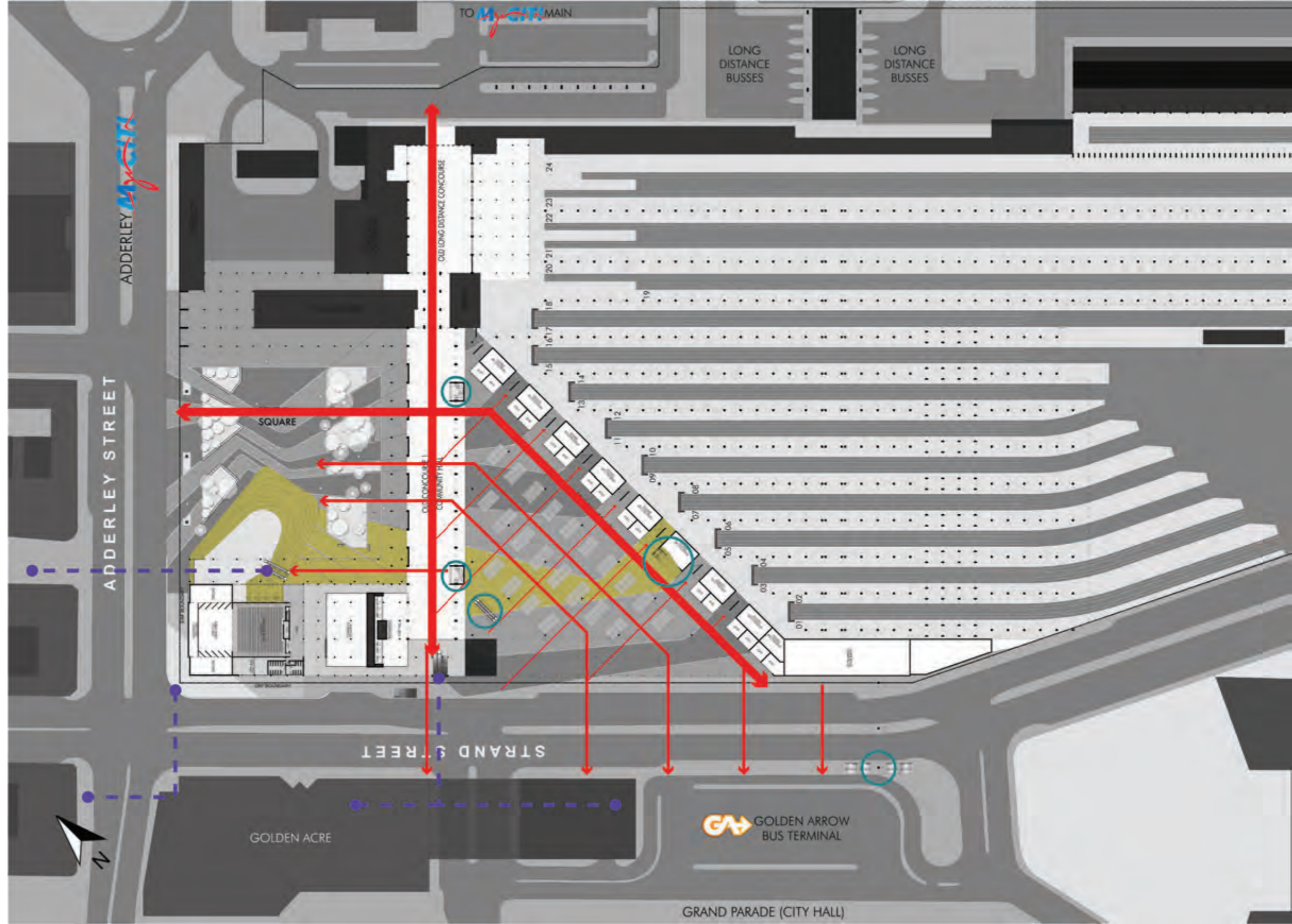
When injecting the new programmes, care was taken to consider the movement of very large amounts of passengers at different times of the day. And also that some of these passengers might use the station for the first time.

To avoid confusion, congestion of pedestrians and stress, emphasis was placed on logical movement, as well as visual connection.

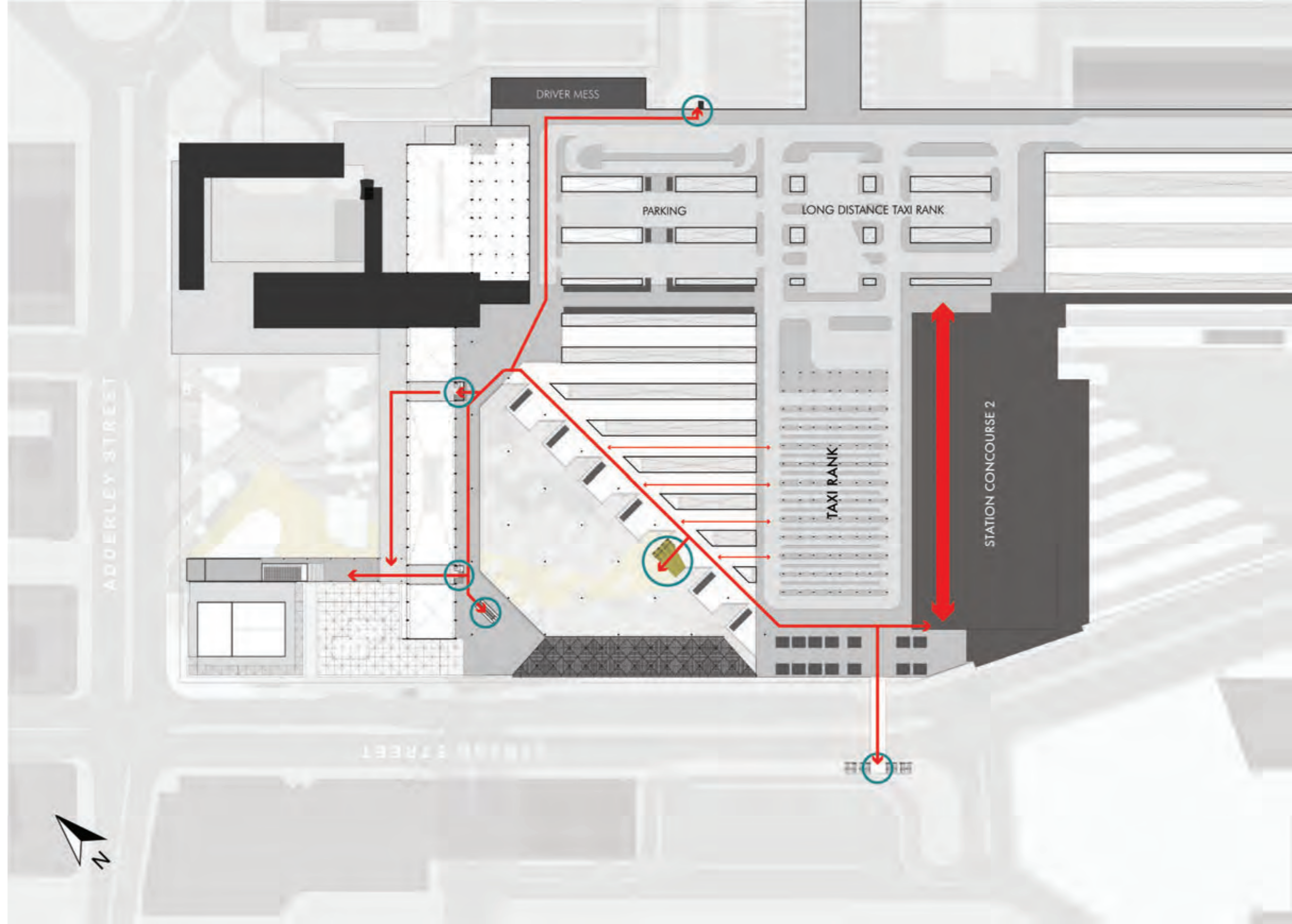
The inter-modal connections between Taxi Rank and Rail, as well as the Golden Arrow Bus Terminal have been strengthened by the intervention. Fig. XX and XX show this network of movement and visual axes.



fig.68 - GROUND LEVEL - Movement diagram of improved movement throughout the station complex. As well as visual axes. (by author)



MAINTAINING LEGIBILITY:




-  Vertical circulation point
-  Varying intensities of pedestrian movement
-  Underground pedestrian links

fig.69 - LEVEL ONE - Movement diagram of improved movement throughout the station complex. As well as visual axes. (by author)

POPULATING THE IN-BETWEEN SPACE AS PLACES OF SOCIAL ENCOUNTER:

This dissertation holds at its core that architecture can be used as a social tool. This has been applied at the investigation of design methodology, in the selection of the project, and the programmatic injections.

Yet, perhaps the most important element that this philosophy should be applied to is the *in-between* space that is in and around or buildings.

Circulation, vertical and horizontal, should be evolved from being purely utilitarian elements of our buildings, but rather spaces of social encounter.

Examples of such instances in the re-imagination of the Cape Town Station are illustrated in *before and after* diagrams.



fig.70 - BEFORE - This image shows the current circulation that connects the Taxi Rank Deck with the pavement. It is purely utilitarian. (by author, base image source: Apple Maps)

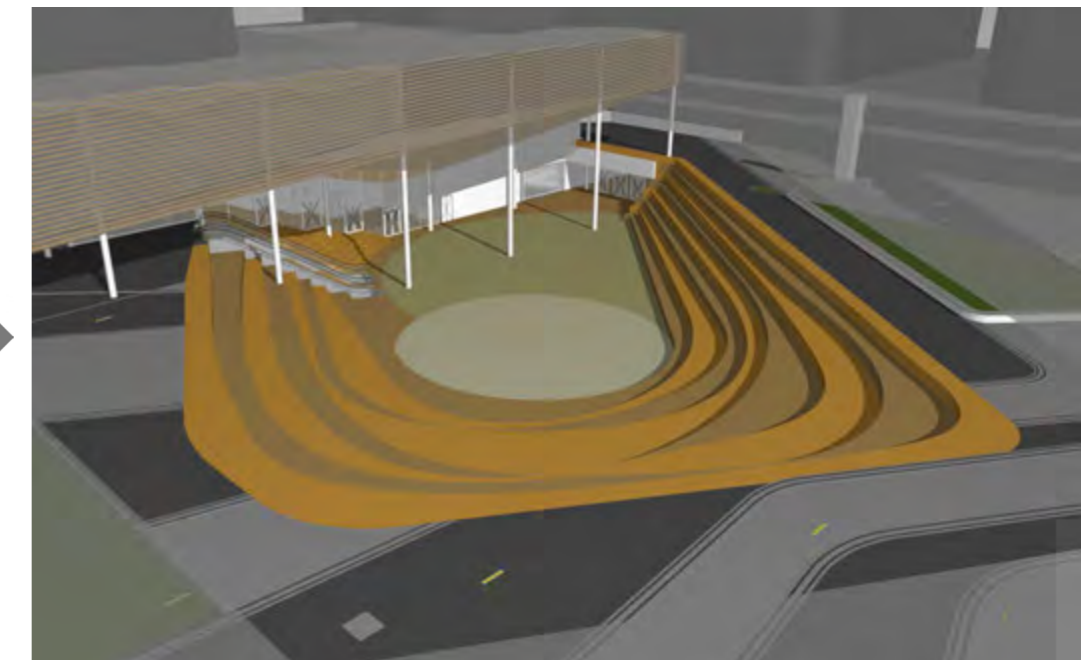


fig.71 - AFTER - This image shows the new circulation leading from the taxi rank level directly into the new concourse of the station. This node of circulation has been designed as a landscape which offers itself for social engagement. (by author)

fig.72 - BEFORE - Shown in this image is the current circulation that leads into the underground connector tunnel under Adderley Street. A closed and utilitarian object. (by author)



fig.73 - AFTER: This image shows the new circulation leading from the station square into the underground tunnel under Adderley Street. It is open and welcoming, and programmatically serves many functions. But most importantly it is a landscape of social encounter. (by author)



FINAL WORDS

With the establishment of a hybrid design method, a clear process came to light about how to address the issue of Identity and Architecture specific to the context of Post-Apartheid South Africa.

This allowed this dissertation to systematically approach the Cape Town Station as a problem in the city, and re-imagine it through the principles that were established.

Any given typology can now be subject to a process of rigorous analysis and be subjected to programming to allow it to place itself more appropriately into the cultures of our society. This could be done for schools, healthcare facilities, community centres, to name a few.

The Cape Town Station now lies more comfortably in the urban environment. Furthermore, this dissertation could be viewed as merely the beginning to a bold and drastic redevelopment of the large piece of land that the station occupies in the city center; where the land can be returned to the people, and the urban fabric of the city can be stitched back together.

The new programming of the Cape Town Station now also places services and cultural coexistence directly into infrastructure which a vast amount of people use every day. This could be seen as a pilot project. The same process can be applied throughout the railway network in Cape Town. Railway stations in all parts of the city could be subjected to the same process.

Perhaps through that, we might all travel much more out of our comfort zones.

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All other images not included in the reference list were created by the author of this dissertation.

APPENDIX A

A concise history of railway stations

Brief History of Railway Stations

As long as there were humans, we have been travelling and moving things. Throughout the history of mankind humans have used various methods to travel: from sledges around 7000BC (fig. 74) to using animals for hauling power in 3000BC; to using horse harnesses by about 800-1100 AD. (fig. 75) The industrial revolution brought about the first versions of steam vehicle in 1769 (fig. 76) and later the steam locomotive with linked cars running on a track. This was demonstrated the first time in 1808 (fig. 77) and by September 1830 the first passenger train travelled along a track in Britain. This was the first time the three elements of railway transport came into co-existence: the locomotive and cars and track, the technical management, as well as a building called the terminal which was used for loading and unloading and the boarding of passengers.

These buildings were rudimentary in design and purely utilitarian. The first railway station that had been architecturally designed is credited to have been built in Woburn, Bedfordshire in Britain. (fig. 78)

Since then, station buildings have evolved as a result of the development of social, economic and technological advances that occurred in and around them. (Mukherjee, S. 2009)

Today, train stations are more than just buildings for the boarding of trains or the loading of goods. They are complex social places that often form a centre of towns or city neighbourhoods.

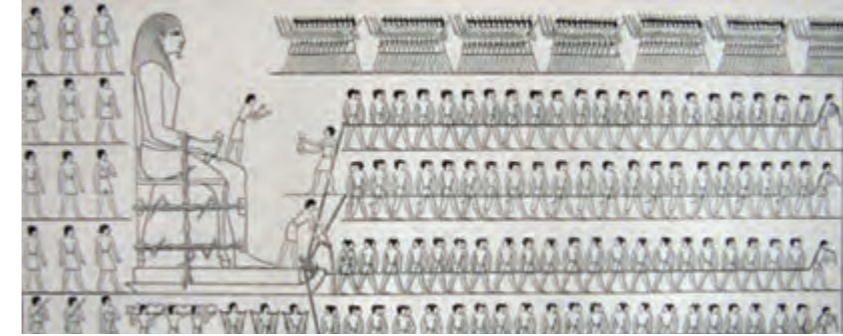


fig.74 - Ancient drawing of Egyptian slaves hauling a statue on a sledge. (source: Huffpost. Image by: Sir J. Wilkinson)

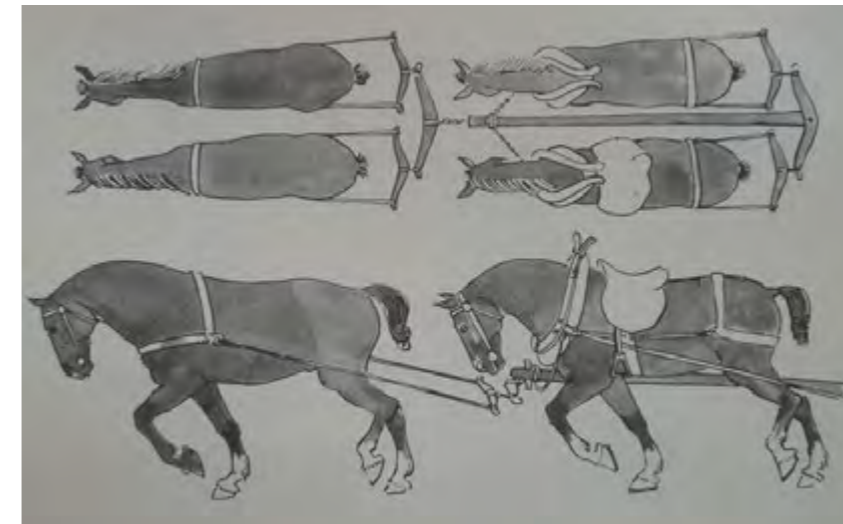


fig.75 - Harnesses were invented to make use of strength of animals to move carts and goods. (source: Wagner E. et al. 2000. Image by: Unknown)



fig.76 - The first steam vehicle by Joseph Cugnot's 1770. as preserved at the Musée des Arts et Métiers, in Paris. (source: Wikipedia. Image by: Joe deSouza)



left. fig.77 - The first locomotive on tracks was demonstrated in the 'steam circus' in 1808. It was called 'Catch Me Who Can'. (source: Wikipedia. Image by: OpenSource)

fig.78 - The first architecturally designed Train Station building in Woburn Britain. 1840. (source: mkheritage. Image by: Frederick Williams)

APPENDIX B

Exploration of railway station typologies

Typologies of Railway Stations + their Elements

Railway stations respond to many conditions in different contexts. This has spawned a variety of Typologies within the type/idea of a station. This chapter will attempt to establish separate categories to define these differences.

The Elements:

To understand the different 'configurations' of typologies below, one has to first understand the two main functional / infrastructural elements that form the basis of a railway station (fig. 79):

One being;

The Concourse:

The concourse is the umbrella term for the part of the overall station that houses the entrance/exit gateway, the hall with the ticketing offices, waiting areas, time tables, passenger services such as ablutions, and most of all ample space for the movement of a large volume of people etc. Concourses also form the architectural characteristic of the station as they are usually facing the street and urban environment and act as the gate into the city.

and the other defining element of the train station type being the;

Platform hall/Train shed:

The train shed is what is called the realm of the engineer in the project of a train station. This is the part of the overall station where the trains halt and the platforms serve as the interface between the train and boarding/alighting passenger. These areas are usually sheltered to protect the passenger from the elements; either in canopies that cover the platform only, or with a large roof covering all tracks and platforms.

*Source: (Meeks, C. 1957) (Ross, J. 2000)
(Klings, U. 1985)*

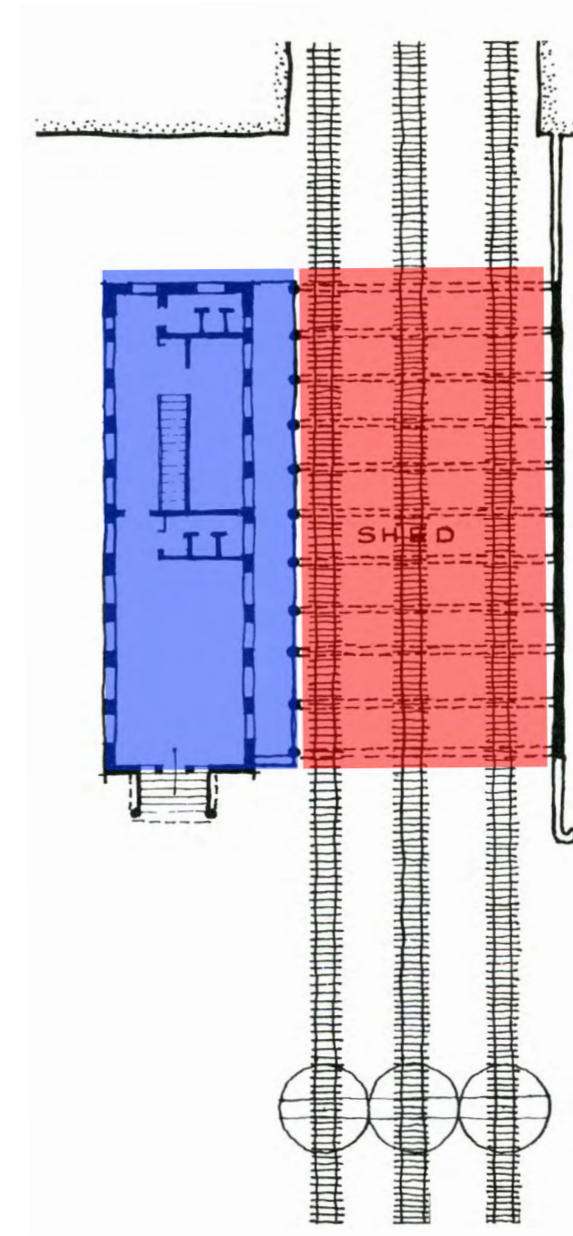


fig.79 - Diagram depicting a simple train station configuration with the two basic elements highlighted:
Blue: The Concourse
Red: The Train Shed.
(source: Meeks C. 1957. Image by: Jack Rose) EDITED by author

Railway Station Typologies:

Different methods of analysis produce different categories of Typologies. The overall categories can be reduced to Functional Types; Types with relation to urban environment as well as traffic volume; Types with relation to their placement within the Railway Network. These Types/typologies create specific arrangements of Platforms, Concourse and Passenger Movement. The following is an explanation of these:

Functional Typologies:

Starting at the very basic definition, stations can be categorized according to their function as follows:

- **Passenger stations:** this category contains, but is not limited to:
 - City centre terminals
 - Interchange Stations
 - Rail < > rail
 - Bus < > rail
 - Air < > rail
 - Road < > rail
 - Sea < > rail
 - Light/Suburban/Rural Stations
- **Goods stations:** only used for the loading and unloading of freight trains.
- **Marshalling yard:** used for the arranging of trains.
- **Storage yard:** used for the storing of locomotives and train carts, also during maintenance.
- **Underground stations:** Also known as the Metro or the Subway; these stations service railway networks that run in a tunnelling system under ground. Stations are commonly reached by stairs/elevators.

*Source: (Meeks, C. 1957) (Ross, J. 2000)
(Klings, U. 1985)*

Typologies in relation to the traffic volume or location in urban context:

Stations can be classified in relationship with their significance in the urban context; i.e. the density of an urban condition, and from that the direct effect on the volume of railway traffic:

- **Small station stop:** Some trains halt here, majority pass
 - Small town/rural stations: These stations tend to be unmanned (no staff) and mostly are very simple with a short platform, and simple canopy or some shelter for waiting passengers.
- **Intermediate stations:** medium traffic, most/all trains halt
 - Suburban station: These stations usually have a large aspect of fluctuations of use during the day with larger commuter numbers during the morning and evening commute, and extremely low numbers of passengers during the day, and none at night. Suburban stations usually also require a large parking area for commuters' motor vehicles.
- **Main Station:** combination of variety of modes of transport, node
 - Large city stations

*Source: (Meeks, C. 1957) (Ross, J. 2000)
(Klings, U. 1985)*

Typologies with relation to the location along/within the railway network:

The relationship between the track and the railway station has a large effect on the function, as well as the typology of the building. The following Typological conditions can be synthesised:

- Terminal:** This is the station at the beginning or the end of a railway line. Mostly these stations occur in large cities that form important nodes within a large national network. These stations also function as a gateway into the city. Terminal stations mostly also have other modes of transport overlaid within them, or near them to facilitate a transfer and freedom of movement. (fig. 80)
- Through Station:** This Typology is most commonly found, and it is defined by the condition that the railway lines pass through the station. The flow of the traffic runs both ways and this condition defines the condition in various ways with platform islands and a passenger over/underpass when there is more than one line. (fig. 81)
- Junction Station:** When railway lines join, or split apart, these nodes might require a point of interchange between railway lines. (fig. 82)
- Route Crossings Station:** This typology results from the condition of two or more railway lines crossing/intersecting one another. This configuration mostly manifests itself in a multi-layered arrangement. (fig. 83)

Source: (Meeks, C. 1957) (Ross, J. 2000)
(Klings, U. 1985)

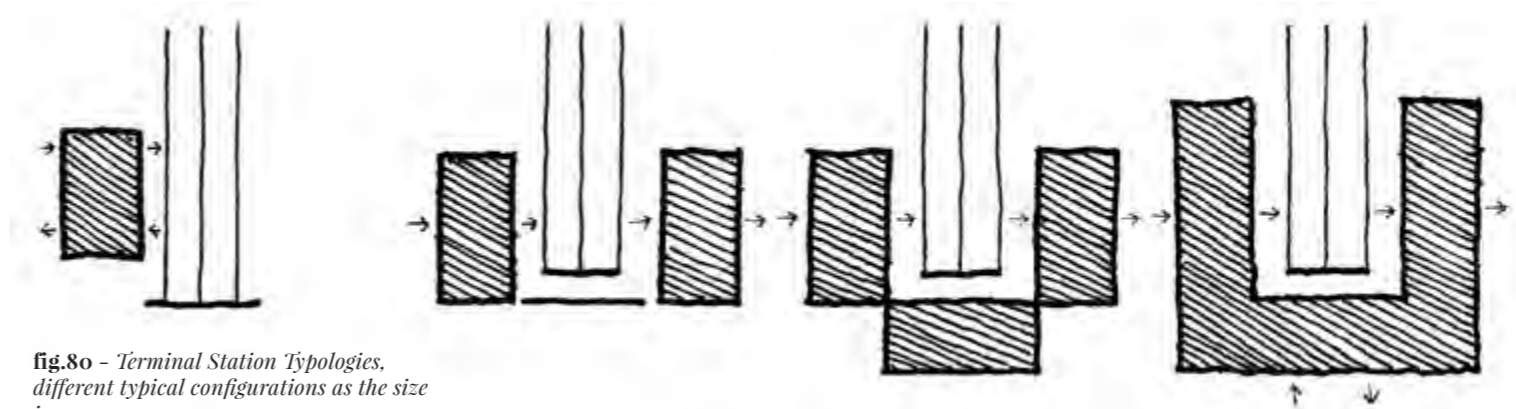


fig.80 - Terminal Station Typologies, different typical configurations as the size increases.
(Diagrams by: author)

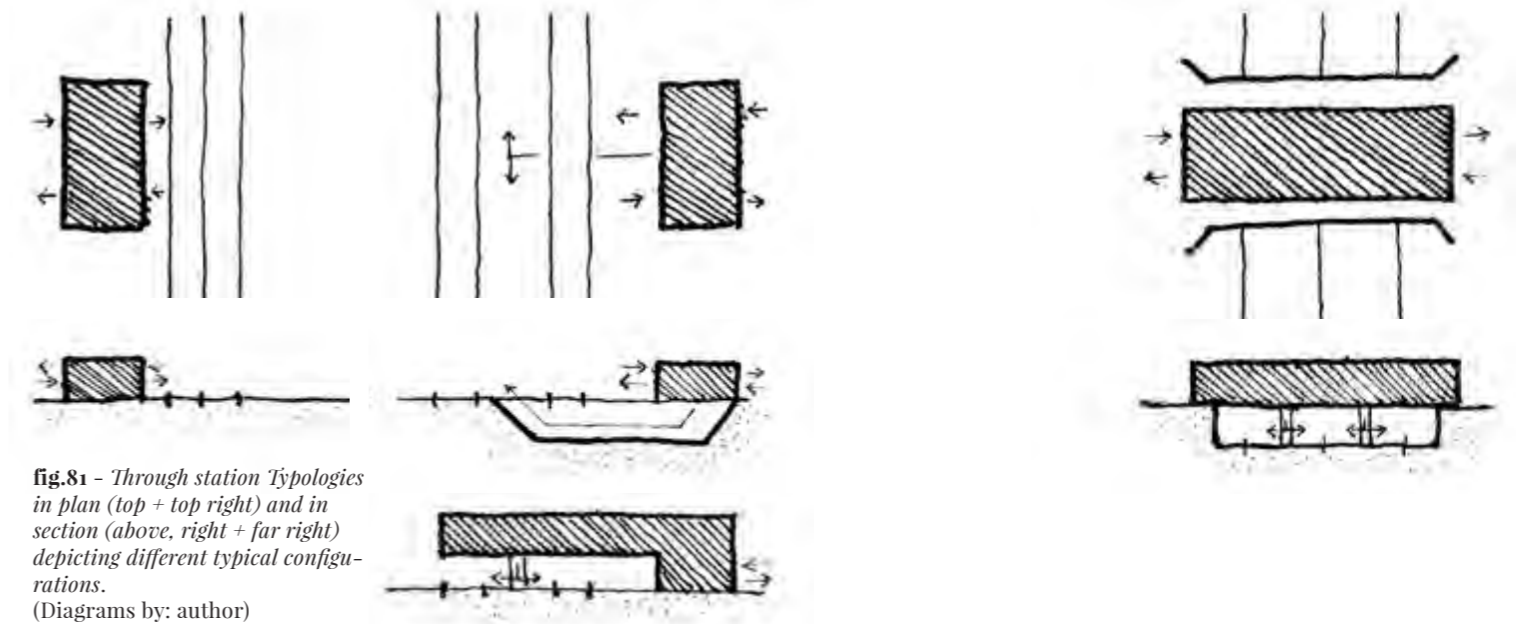
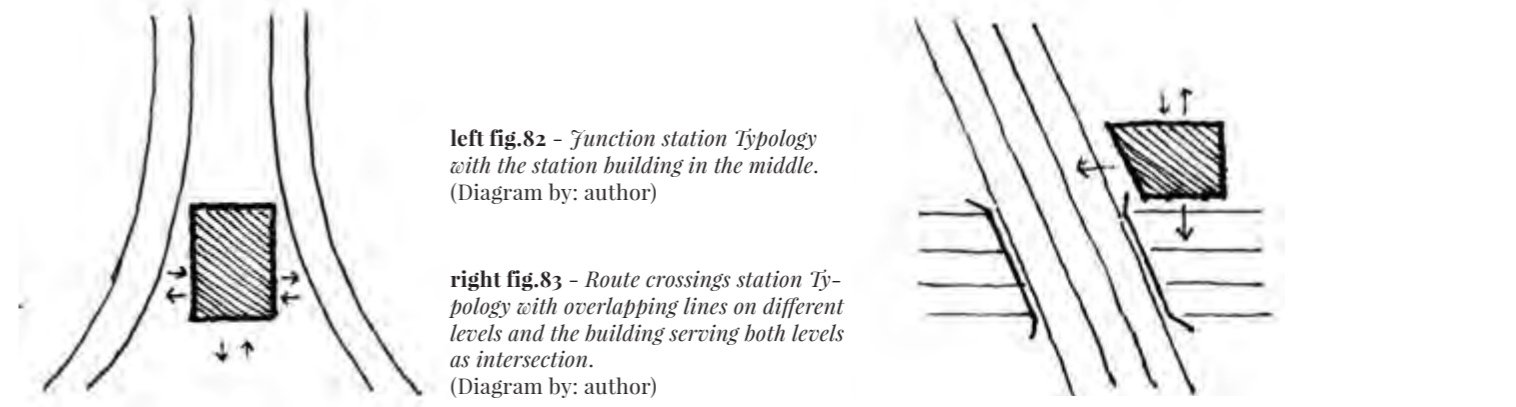


fig.81 - Through station Typologies in plan (top + top right) and in section (above, right + far right) depicting different typical configurations.
(Diagrams by: author)



left fig.82 - Junction station Typology with the station building in the middle.
(Diagram by: author)

right fig.83 - Route crossings station Typology with overlapping lines on different levels and the building serving both levels as intersection.
(Diagram by: author)

APPENDIX C

Systematic, Infrastructural and structural elements of railway stations

The Element of The Roof



Also known as the **train shed**, this is the element that – as previously described – forms the second part of the binary relationship of a train station. It houses the platforms and the tracks where trains halt to service the station. The roof that covers this area is an integral part of station design and has seen many developments over time.

Until the 1830s platform areas used to be un-roofed, as were the train carriages as passengers were accustomed to ride out in the open on stage coaches. (Meeks, C. 1957:27) But soon the amount of passenger transportation increased and the need for protection from weather on platforms caused the first large train shed to be built at the first British station at Crown Street in Liverpool which had a simple timber trussed canopy. (fig. 85+86) (Ibid.)

The larger stations grew over time the larger were their train sheds and so the engineering that went into the structuring of these became increasingly advanced. Smaller train sheds made use of the conventional hipped truss and later the Howe Truss (Ibid:38) (fig 87).

fig.84 - Interior of the train shed of the St. Pancras Station in London by Sir George Gilbert Scott, 1876. The largest of its kind.
(source: Meeks C. 1957. Image by: unknown)



fig.85 - Crown Street Station, Liverpool, Britain, 1831, was the first station claimed to have a simple train shed.
(source: Wikipedia. Image by: S.G. Hughes - T.T. Bury)

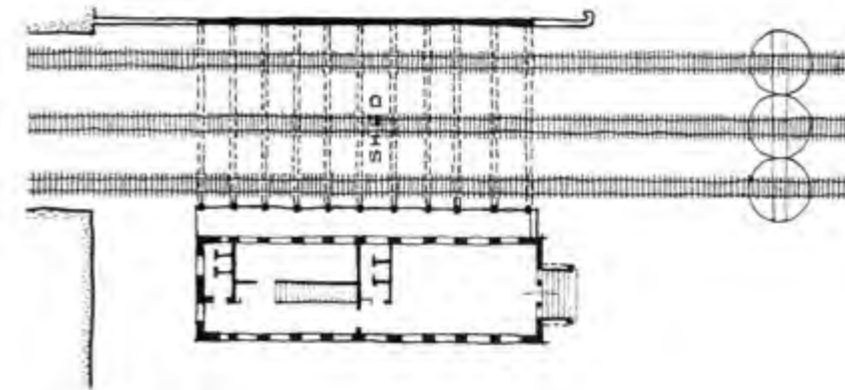


fig.86 - Plan of Crown Street station. The station building and the adjacent train shed are evident.
(source: Meeks C. 1957. Image by: Jack Rose)

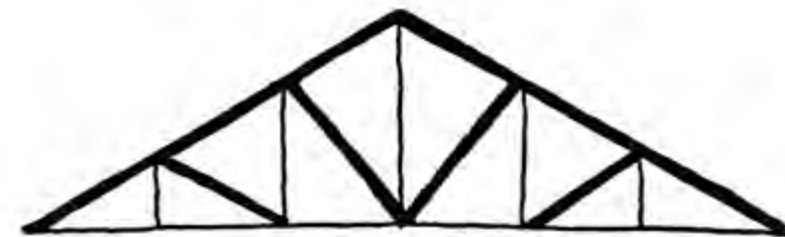


fig.87 - Howe truss, timber, used in smaller constructions of train sheds such as at Crown Street Station.
(source: Meeks C. 1957. Image by: unknown)

However where larger spans were required, tied arch trusses were the next step (fig. 88+89), until later the graceful pure arch without ties were frequently implicated (fig. 90+91) (Ibid:29,84).

People needed the protection of a room yet the freedom and feel of a street. This resulted in the “room street” (Ibid:62) with the vast cast iron and glass train sheds which were detailed to have either unglazed sections, or openings in order to allow the smoke and steam from the locomotives to escape (fig. 92). This provided light and air and the impressive large volumes as well as protection from the elements.

As technology and materials developed in complexity, so did the roofs of the train sheds. The modular nature of train sheds allows for constant expansions of platforms in length and width, and we still find the different configurations today. (fig. 93)



fig.88 - Tied arch trusses at Berlin Potsdamm Station 1972. (source: Krings U. 1985. Image by: unknown)



fig.89 - Section of train shed with tied arch. Gare de l'Est Station. (source: Meeks C. 1957. Image by: unknown)



fig.90 - Arch without ties at New York's first Grand Central Station 1971. (source: Meeks C. 1957. Image by: New York Central System)

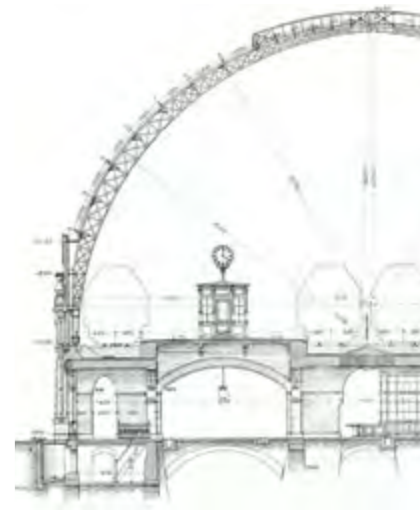


fig.91 - Section of train shed with arch without ties. Berlin Alexanderplatz Station 1880 (source: Meeks C. 1957. Image by: Unknown)

fig.92 - Image of the interior of a train shed showing the air quality and the need for natural light and ventilation. Liverpool Street Station, London. 1875. (source: Meeks, C. 1957. Image by: British Railways)

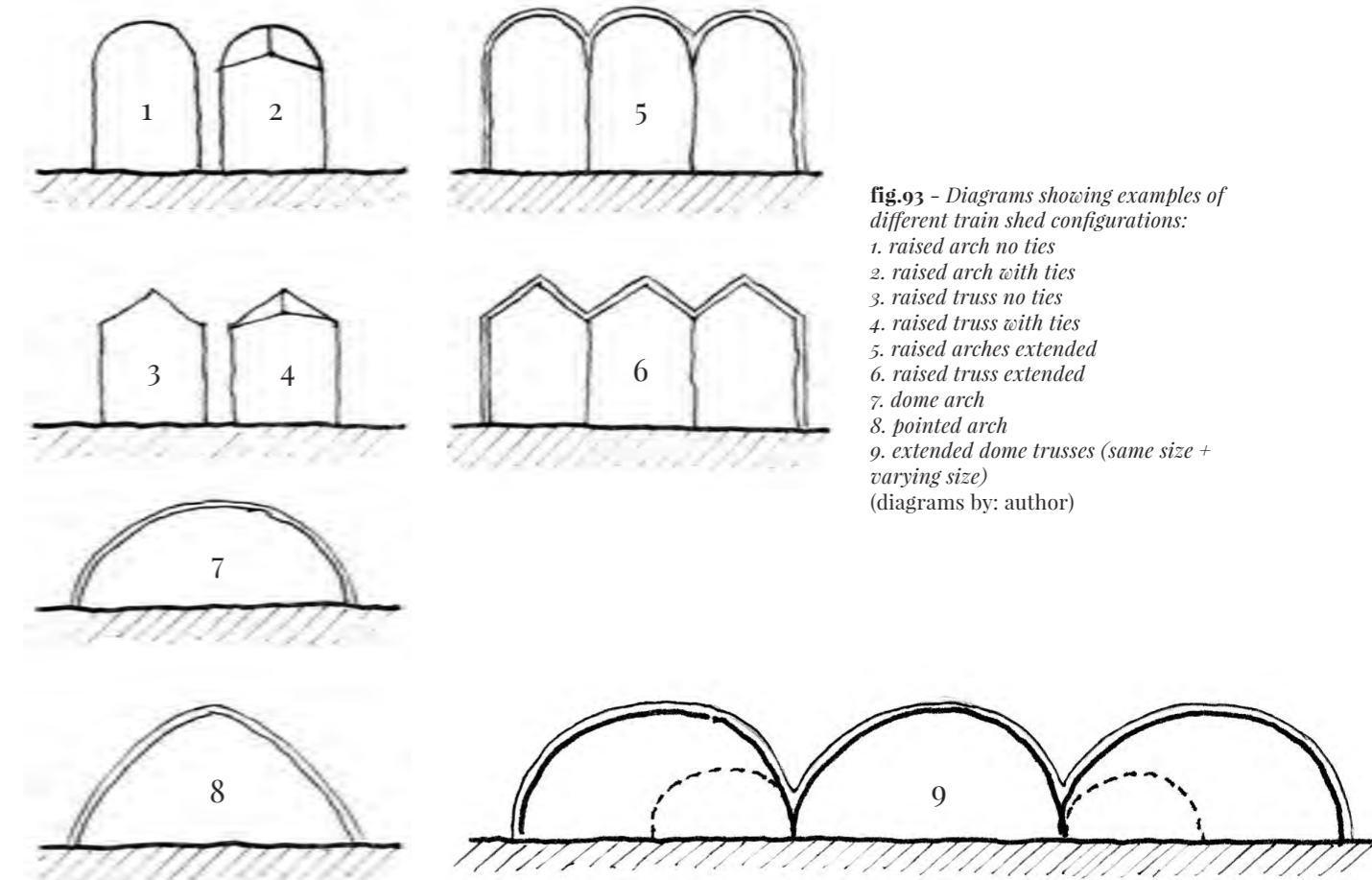


fig.93 - Diagrams showing examples of different train shed configurations:
 1. raised arch no ties
 2. raised arch with ties
 3. raised truss no ties
 4. raised truss with ties
 5. raised arches extended
 6. raised truss extended
 7. dome arch
 8. pointed arch
 9. extended dome trusses (same size + varying size)
 (diagrams by: author)

With the invention of reinforced concrete and the establishment of the modern movement, Train sheds lost their elaborate roof structures and were replaced by concrete roof slabs. Stations seemed to turn into purely functional spaces, rather than places of emotion and delight. (fig. 94+95)

The post-modern time seems to have brought back the nostalgic notions that are embodied in the vast volumes and acrobatic spans of train shed roofs that reintroduce the image of the 'room street'. (fig. 96)

The flexibility of a train shed gives it the element of timelessness. It adjusts effortlessly with the advancements of technology, and so has remained an integral part of train station typologies.



fig.94 - Concrete was shaping a new structural typology for train sheds in the time of modernism. Middlesex Station, Uxbridge. 1938.
(source: Meeks C. 1957. Image by: London Transport Executive)



fig.95 - Station in a modernist design with the flat concrete roofed train shed. Stazione Santa Maria Novella, Florence.
(source: Meeks C. 1957. Image by: Ministero dei Trasporti)



right page fig.96 - Post Modern train shed by Santiago Calatrava shows the rebirth of the voluminous roof construction. Liege, Belgium.
(source: skyscrapercity. Image by: ThatOneGuy)

These two images placed next to each other demonstrate one very important point of my argument. While railway stations are vastly intricate systems of infrastructure, structure and systems, they still effortlessly adjust to changes in technology, society and economy.

This sets railway stations apart from most other institutional buildings. Architecture is known to be quite monolithic and once finished, buildings have a hard time adjusting. This does not apply to railway stations. The progress is clear in these images (fig. 97+98).

Individual elements are able to be modified without having to move or demolish the entire system.

fig.97 - *The etching shows the interior of the Frankfurt Terminal Station, Germany at the time of opening in 1808.*
(source: dmm.travel. Image by: unknown)



This might also be an effect from the fact that railway stations are incredibly expensive to build. They also rely on a vast network of infrastructure (railway lines coming into the building from the city) which is not easily moved. So as human kind requires technology to advance at a rapid pace, the railway stations could not be re-built at the same rate. Instead they had to adjust internally. And so Typologies of railway stations have developed an inherent flexibility.

fig.98 - *Image showing the interior of the Frankfurt Terminal Station, Germany, in the 21st century.*
(source: flickr. Image by: zacke82)



Infrastructural + spatial requirements of a railway station

A Terminus station is a complex network of systems that work in unison to allow for the building to successfully fulfil its duty. These requirements can be categorised as technical, infrastructure and spatial/functional requirements of passenger.

The Platform:

The platform, as mentioned before, is the area where passengers wait to board a train, as well as alight onto when exiting the train. This area is the interface between the station and the train and has to be carefully designed in order to provide a comfortable and safe environment for passengers.

The diagrams (fig.99) illustrate that generally there are two types of platforms. A side platform which, as the name suggests is on the side of the station and only services one train; and an island platform which is located in between tracks and can service both of them.

Platform Area + Width:

The areas for these platforms are to be calculated with a minimum spatial requirement per passenger. Passenger numbers are calculated using the anticipated flow of people during peak times of use. This means that the passengers waiting to board a train, and the passengers that are alighting the train, as well as passengers waiting for later trains have to be added to get the total number of potential passengers. A general minimum required area per person is estimated between 0.5-0.8 m². (Ross, J. 2000:120) (fig. 26)

The minimum widths for station platforms are:

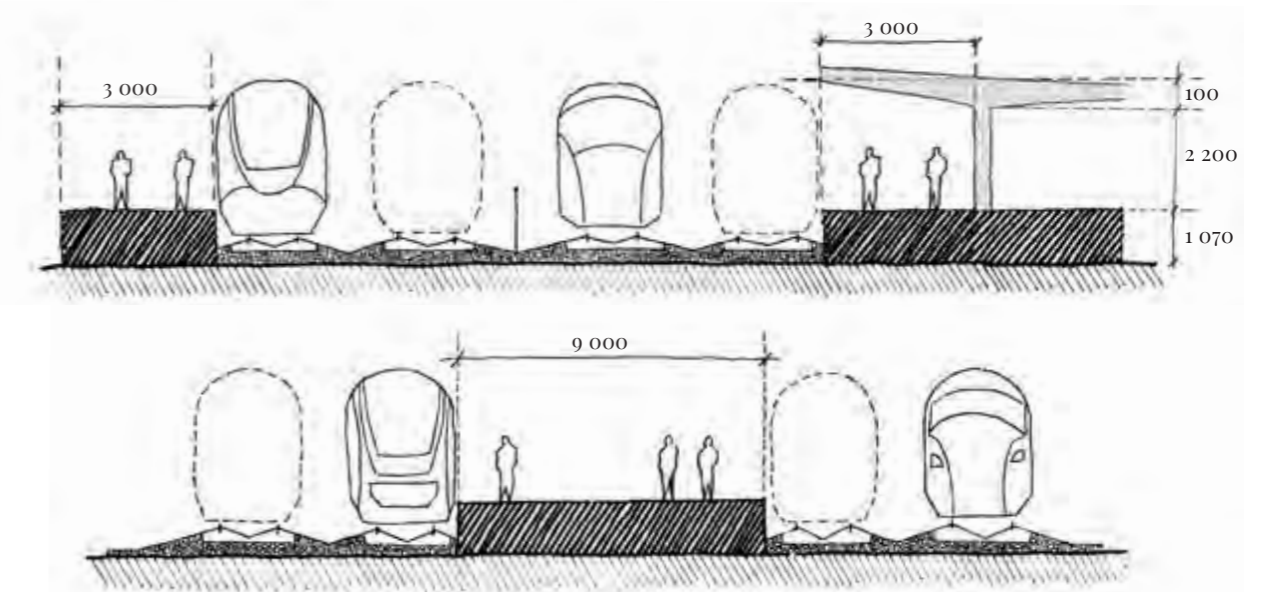
Side platform: 3000mm between the platform edge and the nearest structure.

Island platform: 9000mm from platform edge to edge.

(Railway Safety Regulator South Africa. 2015:28).

Entrance + Exits:

Entrances to platforms should be clearly marked and strategically placed to allow for even distribution of people along the platform. Escalators/ramps/



stairs leading onto the platform should be in-line with the direction of the tracks. (Ross, J. 2000:121)

fig.99 - Sections showing Side Platforms (top) and Island Platform (above) with minimum dimensions. (Diagrams by: author)

Safety Margin:

Train tracks are dangerous to passengers, especially when electrified.

Passengers should always be made aware of the edge of the platform in order to avoid any injuries by falling onto the track system.

Passing trains also have a 'kinematic envelope' that exercises a dragging force onto passengers that are too close to the edge.

Therefore there are minimum distances that are to be marked clearly on the platform floor to warn passengers; either by a contrasting colour line or a change in material of a contrasting colour. The safety margin should be minimum 1000mm (fig. 100)

(Railway Safety Regulator South Africa. 2015:28).

Length:

Platforms must be long enough for the entire train to be accommodated. A margin of error has to be added of at least 2000mm to allow for inaccurate stopping of trains (Railway Safety Regulator South Africa. 2015:30).

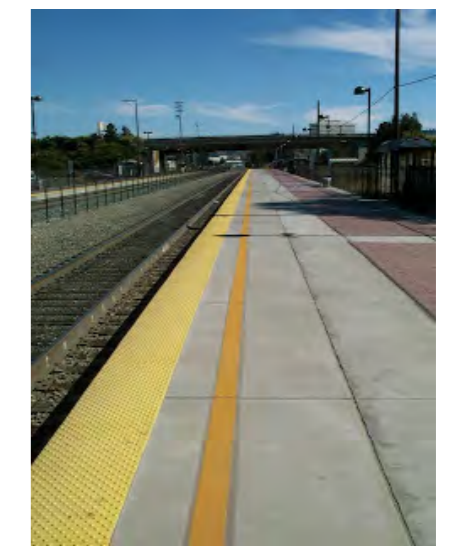


fig.100 - Safety indicators on platform edge. (source: caltrain-hsr. Image by: unknown)

Platform edge clearance:

This is the minimum distance between any structural elements or furniture etc. that is part of the platform and the edge of the platform, in order to stay clear from any moving parts railway. (Ross, J. 2000:122)
The minimum distances are 3000mm from platform edge. (Railway Safety Regulator South Africa. 2015:28).

Stepping distance:

The stepping distance is the horizontal/vertical gap between the edge of the platform and the floor level of the train carriage. Platforms are to be designed to have a maximum gap of 250 mm vertically; 275 mm horizontally and 350 mm on the diagonal. (Railway Safety Regulator South Africa. 2015:28).

Headroom:

For the safety of passengers, a minimum headroom clearance of 2300mm is to be kept along the entire length of the platform. This includes undersides of signage etc. Where such elements are further than 3000mm from the platform edge, the headroom may be reduced to 2200mm. (Ibid:28).

Other specifications:

Other important specifications for the Platforms of a train station include a 300mm wide safety recess under the edge of the platform along its entire length to allow for a refuge for persons in an emergency.

The platform is to always drain away from the train tracks.

The general height for a platform in South Africa should be 1070mm +- 10mm.

(Ibid:29-31).

The train track:

Also called the 'ballasted track' or the 'conventional track', the train track is the infrastructure that the entire system of railway transport bases on. While the technology of train track construction has improved over time, the basics remain the same.

The track is made up of a 'flat framework made up of rails and sleepers' (cite) which are connected by fasteners of various kinds, and this is rested on a layer of ballast which is usually a specific grade of gravel laid to provide a buffer between the natural ground and the track. While the general track used to be the only infrastructure

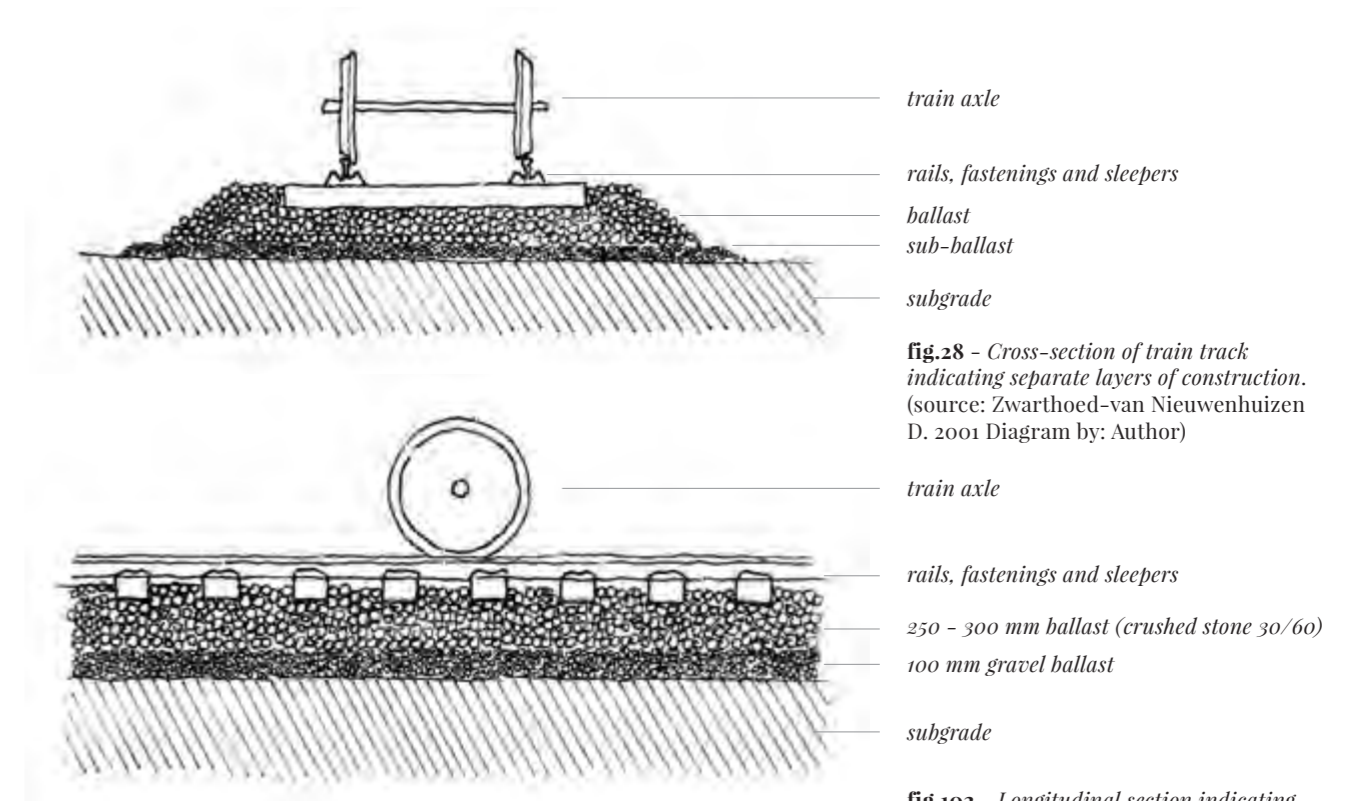


fig.28 - Cross-section of train track indicating separate layers of construction. (source: Zwarthoed-van Nieuwenhuizen D. 2001 Diagram by: Author)

fig.102 - Longitudinal section indicating separate layers of construction. (source: Zwarthoed-van Nieuwenhuizen D. 2001 Diagram by: Author)

The Passenger:

As important as the standards that are required by the infrastructure inherent in train stations, so are the requirements by the people who use the building on a daily basis. These basic requirements are the basis of the success of these typologies. And as the quote above states, the more elegantly they are incorporated with one another, the better the result.

The main categories of passenger requirements can be reduced down to those of movement; *light + air; facility; safety; and inclusiveness.*

Movement is perhaps the most important aspect. The success of a station relies on clarity of route, which means both clear signage as well as a clear visual link between main nodes within a station. This will prevent people from stopping to make decisions and blocking the flow of movement. (Network Rail, 2015) Yet a good design is where a passenger knows where to go without the need for signage.

Clarity in movement – and with that eliminate frustration – can also be achieved by routing entrance and exit traffic separately. (Mukherjee, S. 2009)

Delight, can be broken up into several aspects of light, colour and sound.

A balance in natural and artificial **light** has to be achieved, and any form of glare has to be avoided.

Colour can bring a station to life and will create character, yet it is also used to contrast between vertical and horizontal planes for visually impaired passengers.

Sound is to be balanced, especially in spaces of large volume, as to not be too quiet, yet also not too loud for the public announcement system to still be audible. (Network Rail, 2015)

Facilities include basic needs facilities for passengers such as appropriate amount of ablutions as well as ticketing stations, information points, refreshment and retail. This aspect of ‘functional mix’ is the opportunity

“We delight in complexity to which genius has lent an appearance of simplicity” (de Botton, A. 2006)

for a station to define itself outside of its basic purpose, as well as generate revenue for the running of its service; (Network Rail, 2015) however it is important that these facilities do not clash with the functional needs of the station, such as clarity in signage (avoid clutter) and easy movement. (Mukherjee, S. 2009)

Safety is imperative in public spaces. The aspect of safety relies on visibility in space, and visibility in lighting. Spaces should be devoid of dead ends and secluded areas, and the entire station should be well lit. Safety facilities should also be provided such as panic buttons and emergency call facilities. (Ross, J. 2000)

Inclusiveness is the foundation of democratic public space. And so care has to be taken to ensure that all people are able to make use of the facilities. Access to disabled people should be considered with every element of the building: for example at point of level change, or access points, as well as movement routes etc. (Ross, J. 2000)

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