

# An Approach to Urban Restructuring and Intensification in Cape Town: The Case of Wingfield



**Faranaaz Bassa BSocSc(Hons)**

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# *Abstract*

Patterns of urban growth in South African cities reflect high levels of socio-economic inequalities, which are exacerbated by rapid population growth and urbanization. These conditions are experienced by many of South Africa's major cities, including Cape Town. The focus is on the inequitable and inefficient urban structure of South African cities, as well as the emerging global challenges for urban growth management faced by cities around the world. In response to these issues, the dissertation argues for strategic intensification on a well-located underutilized piece of land, in order to begin to reverse the skewed and non-integrated urban patterns prevalent in Cape Town. Moreover, the dissertation provides a case, which indicates a different way of thinking about urban restructuring, in the context of South African cities and particularly in the case of Cape Town. The Wingfield site is a strategically significant area as it is an inner city and corridor-reinforcing site allowing access to concentrations of existing opportunities. The restructuring and intensification of Wingfield intends to serve as a "pilot project" that could inspire similar local restructuring proposals to address the current structural inefficiencies of the Cape Town Metropolitan Region. The plan, therefore, requires restructuring of the existing urban structure towards a more integrated urban form, which is critical to the creation of positive urban settlements.

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# LIST OF ACRONYMS

Bus Rapid Transit (BRT)	
City of Cape Town (COCT)	
Cape Town Metropolitan Area (CTMA).	
Cape Town Metropolitan Region (CTMR)	
Cape Floristic Region (CFR)	
Central Business District (CBD)	
Spatial Development Framework (SDF)	
Sustainable Urban Drainage Systems (SUDS)	
Transit-Orientated Development (TOD)	
United Nations Educational, Scientific and Cultural Organization (UNESCO)	

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# CHAPTER 1

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## Introduction

Prior to 1994, modernist-planning paradigms and Apartheid policies that promoted segregated development shaped the urban form of South African cities. The legacy of the above ideologies has left South African cities with a highly inefficient and skewed urban form. The spatial consequences stemming from the ideologies of are prevalent in the majority of South African cities today. The inefficient urban form is seen through a combination of sprawl, segregation and fragmentation which has resulted in a loss of agricultural and wilderness landscapes and potentially productive land and land of high amenity, the generation of movement is primarily based on unsustainable modes of transport such as road based individual transportation modes (the private vehicle). Additionally, low-density sprawling development inhibits the provision of a viable and efficient public transportation system. A further spatial consequence prevalent in South African cities are the limited choices in terms of movement which poor people are affected with, resulting in them having to travel long distances. This has implications in terms of household budgets and affordability. As a result many poor households are 'trapped' in space, they are unable to travel to seek employment and are thus dispersed and almost removed from opportunities of the city. Development densities are also usually low to support adequate levels of social facilities and as well as to create vibrant local markets, which are pre-requisites for the emergence of rigorous growth and diversified income. According to a United Nations publication, several South African cities are now considered to be the most inefficient and inequitable in the world (UN-Habitat, 2013). This has implications in terms of lost opportunities for socio-economic advancement (for example, local economies and quality of life that are crucial for the prosperity of cities). Although the problems associated with sprawl, fragmentation and separation are not exclusively found in South African cities; they are recognized as being amongst the worst in the world.

Intensification is important for two structural reasons. The first is increase urban efficiencies through reduced aggregate amounts of movement, higher thresholds for public facilities, vibrant local markets for small-scale businesses and more efficient service runs.

The second reason is to reinforce structurally significant points and lines to create special places and increase the efficiency and viability of public transportation (Dewar & Todeschini, 2004).

The City of Cape Town (COCT) is situated within the Cape Floristic Region, a biodiversity hotspot and one of the six floristic kingdoms in the world. The city prides itself on its natural wealth and biodiversity, which contributes towards making it a desirable place to live, work and play and a major driver in attracting tourists to the city. Consistent with the generic urban problems in South Africa, however, Cape Town faces immense challenges in terms of population growth; urban sprawl and low-density residential development; environmental challenges associated with growing consumption; and pollution that threatens the resource base of the region which also has implications for climate change in terms of energy, water and food security. Cape Town is also faced with major socio-economic challenges that includes high levels of poverty and inequality and an educational mismatch in terms of skills supply and demand. There is also a dire need for the provision of housing and the upgrading of informal settlements in the city. An increase in both immigration and population growth has given rise to newly settled households in the city, with the rate of subsidised public housing delivery being inadequate to meet the demand for housing. This has also resulted in a large proportion of the population living in informal settlements with inadequate services and infrastructure. In terms of transportation, increased reliance on the private vehicle and an ineffective public transportation system remain one of Cape Town's biggest mobility challenges. Lastly, Cape Town remains a crime hotspot and includes the highest prevalence of murder and drug-related crime in South Africa.

These challenges all require serious attention in order for South African cities to achieve social equality and to effectively compete globally.

This project proposes restructuring interventions, which attempt to deal with the challenges facing South African cities and Cape Town in particular. The aim is to reverse the current skewed urban form to create a more positive, socially equitable and efficient urban environment. The purpose of the dissertation is to demonstrate a new way of thinking about urban structure or the ordering system that underpins the logic of urban systems.

Since democracy, the Cape Town Spatial Development Framework (SDF) and supporting policy documents have argued for the reversal of the skewed urban form prevalent in Cape Town and has called for various urban restructuring tools that include densification and intensification to integrate the Cape Town Metropolitan Area (CTMA). This is in an effort to provide greater access to socio-economic

opportunities and to achieve social justice. However, the results of these integrated planning mechanisms has been

minimal in terms of spatial integration between the rich and the poor. This is a concern as there are sufficient parcels of vacant and under-utilised land that can be used for strategic intensification and which can enable the location of the poor closer to economic opportunities.

This dissertation argues for the potential utilisation of these well-located and under-utilised land parcels for implementing dense and intense mixed-use urban developments that serves to integrate the poor and improve access to socio-economic opportunities. This will not only allow for social equity to be achieved but will also contribute more positively towards a more densely integrated and accessible city as a whole.

The main focus of the dissertation is a redevelopment proposal for Wingfield. The Wingfield area was chosen for this project, as it is one of the most strategically located vacant land parcels to initiate the urban restructuring process. Furthermore, Wingfield is an inner city and a corridor-reinforcing site, informed by the southern and western corridors, namely, the Voortrekker Road corridor to the South of the site and the Koeberg Road corridor to the west. This highlights its strategic potential of Wingfield and presents the site as an ideal opportunity for urban restructuring. Intensification around structurally significant places and the corridor as an instrument of intensification is seen as central to the project with the focus being on taking people to services and opportunities and taking services and opportunities to people.

The intention is therefore to restructure the urban environment at a variety of scales in order to create a more efficient, equitable and sustainable urban form. This involves two dimensions, firstly, to control sprawl and to reduce lateral spread significantly and the second is to intensify and densify in order to capitalise on the benefits of urbanity such as enabling the expansion and diversification of small and micro-enterprise economies. In perusing intensification it is necessary to think both strategically and structurally. The project will therefore aim to design housing and mixed-use infill projects around clusters of existing urban opportunities and reinforce corridors carrying forms of public transportation and significant public transit stops

## Methodology: Design Method

An interrelated approach to urban development stems from a methodological sequence, which underpins any physical design decision. This sequence includes the aspects of need, programme, idea, context and process. Need refers to urban actions and decisions: which relate to the needs, requirements and priorities of urban dwellers and is based on two ethical pillars, namely, humanism and environmentalism. Dewar and Uytendogaardt (1991) state that "need" has no form, but has implications for form. To this extent, human needs are of two kinds: individual needs that should be considered in order for individuals to lead enriching lives as well as the actions which create contexts that enable people to improve their circumstances (for example, in the face of high levels of poverty and unemployment, there is a need to generate opportunities for small-scale activities). As these people have limited options but to seek survival through self-generated employment in the informal sector of the economy, the "need" to find places to manufacture, trade or provide services at low overheads is vital. Another important need is concerned with access: all urban inhabitants should enjoy easy and equitable access to urban opportunities.

The second type of "need" refers to collective or group needs, which is a collective set of requirements when people live socially. A crucial starting point in terms of human needs is to begin with the 'lowest common denominator', that is, people moving on foot, people with limited personal resources and technologies and people with disabilities. Need then gives rise to programme, which translates "need" into the language of space. As in the case of need, "programme" has no form, but rather it has implications for form. Additionally, there are two levels of "programme". The first and highest level of "programme" is performance expectations, that should guide the design. The second and lower level of the meaning of "programme" is focused on land uses (Dewar, forthcoming). It refers to the space budget which initiates the project, in this instance, land use patterns are conceptualized, separated and distributed in space. Furthermore, it involves quantitative space demands being calculated on the basis of a range of thresholds, with the end product being a land use schedule (for example, "x number of households can support y primary schools" and so on) (Dewar, forthcoming:12).

"Idea" identifies spatial relationships, which contribute to "need". It is considered to be the "how" of the programme: it illustrates how desirable qualities can be achieved. In other words, it is the diagram of desired spatial relationships,

which underlies the spatial plan (Dewar & Uytendogaardt, 1991). "Context" is then the application of idea to place and involves the translation of generic ideas into specific forms. To this extent, it ensures that the form of specific physical and social realities of a particular context animates these ideas.

Design methodology is therefore process-orientated, as the plan is initiating and facilitating rather than prescriptive. To this extent the plan should also indicate a minimum set of spatial interventions, rather than attempting to be entirely comprehensive (Behrens & Watson, 1996). Furthermore, at each scale plans should provide the minimum strong actions necessary to give direction, while allowing maximum freedom for the ingenuity and creativity of both designers and decision-makers, in order to enrich the emerging realities. Plans should also be value driven: the outcome must be the creation of urban environments, which meet the requirement of human need and environmental sustainability. These values must be made explicit at the start of the planning process to ensure goals; objectives and plans are consistent with these values. Lastly, design methodology involves cyclical refinement, which is a shift away from a process that is linear and technical to one that is normative and cyclical. This ensures that the planner's responsibility is to make value-driven decision. As with any planning process, it involves both value judgement and repetition in bringing together of all contextual and conceptual investigations, end-user participation and testing of ideas at various scales (Behrens & Watson, 1996).

This is reiterated by Dewar and Uytendogaardt (1991) who state that although all physical design engages with these steps, it need not be done in a sequential manner. The process is thus cyclical with understandings gained in one place, feeding back into, and leading to adjustments in others.

## Method: Package of Plans

The project focuses on the restructuring of the Wingfield site as a point of departure in the redevelopment process. This has wider implications in terms of reversing Cape Town's skewed urban form into a more dense and integrated urban environment. The Wingfield site is situated in a strategic location and plays a crucial reinforcing role in terms of access to concentrations of existing opportunities (ibid.). Prior to commencing with the formulation of development and design proposals, a series of analysis were undertaken at various scales within the city, in order to understand the urban situation in Cape Town, as well as the role of Wingfield in this context. The aim of the method is to consider systems in totalities, to enable a better understanding of spatial structure and order. In essence, it involves uncovering this order based on two dimensions. The first is structure (the relationship between objects in space) and the second is space as a facilitator of life (a more qualitative process).

The plan to be developed is the instrument to users of space and provides these users with a logic to which they can in turn respond. As will be apparent in the subsequent sections, in South Africa the urban structure is disorderly, and thus it is often unclear where activities and uses should go. The project involves a cascading methodological system, which requires thinking between scales and the constant process of iteration and refinement. It is based on a memorandum: at each scale the minimum strong actions necessary to give direction are identified and provide the first level of fixes for the next level down. This project involves four levels, which include an analysis and design component:

-A wider Metropolitan context;

-A Sub-Metropolitan context which includes the study area and surrounds;

-Site level and;

-Precinct level

The analysis phase involves an assessment of the existing conditions of the area and seeks to determine its relationship with the wider context. To this extent, it involves a consideration of the spatial, social, economic, environmental, heritage, infrastructural and land ownership components of the area. This "data collection" or analysis stage is then mapped spatially to represent these existing conditions. The next step in the process involves presenting the findings of the analysis as spatially synthesized research findings and established constraints and informants. The design proposals will essentially depict the way in which these opportunities and constraints have been harnessed. Therefore, once the values and ethics have been established, the subsequent steps which follow form part of the Package of Plans Framework.

The Package of Plans approach also involves different design layers, which begin with the broader conceptual design principles and lead to more detailed implementation proposals. Once again, at each scale, constraints and informants are identified and a framework concept is developed. The framework concept identifies the minimum strong actions necessary to give an overall clear direction to the plan. In addition, these decisions represent "fixes" which are passed on to consecutively smaller scales (ibid.)

In all cases, design challenges need to be approached

in two ways. The first is conceptual and focuses on understanding the essential nature of the problem and on identifying the role and highest and best use of the site in question. This stage is centrally engaged with issues that relate to the role of the site and its integration with broader regionally, rural or urban systems on which it impacts. This serves to uncover the potential of the site, in contributing to the broader context. The product of this is essentially a conceptual diagram.

The second approach is contextual and is based on two central questions, which fundamentally drive the process. The first question is where development should not go. The second question involves identifying contextual factors, which need to inform design. These decisions are based on the natural landscape, heritage and cultural landscape, infrastructural elements and design-related factors. The product of this phase is then a composite map of all the relevant information to allow for a more holistic interpretation of the nature of the challenge.

#### *Metropolitan Analysis*

In terms of the Wingfield project, the metropolitan analysis involves a comprehensive understanding of the role in which the Wingfield site could play in the metropolitan context. To this end, the metropolitan analysis involves an assessment of the urban structuring elements, which range from the higher order: green and blue systems, movement systems and public institutions. These collectively form the primary structuring elements at this scale, and are considered to be the ordering system underpinning the logic of urban systems. The aim of the metropolitan analysis is to determine the significant impact, which these structuring elements have on the functionality of the metropolitan region. More importantly, it seeks to determine how these aspects contribute towards the metropolitan area's skewed urban form.

#### *Site and Environs Analysis*

The next step in the analysis phase is concerned with the "Study Area" and its surrounding context, and is conducted at the sub-metropolitan scale. The main purpose of the analysis in the "Site and Environs" stage is to understand the local, natural and structural context surrounding the site. To this end, the analysis is based on the structural and biophysical elements on and in close

proximity to the site. This stage of the analysis concludes with the major informants that relate to the relevant development opportunities and constraints, which will serve to guide or inform as well as direct the development proposals. The purpose of this analysis is to determine the role of the site in relation to its integration with larger urban systems.

#### *Precinct*

The last stage for the purposes of this project is the precinct plan, which involves the overall site divided into a logical sequence of smaller land parcels for more detailed urban design attention. This stage involves the breakdown of four superblocks to a sub-divisional level and the allocation of building typologies, key layout features and intensities. These fixes are required to ensure the integrity of the overall environment and that each building plays its optimal role in ensuring the spatial quality of the whole.

#### *Implementation*

The implementation procedure is the final step within the planning process. It serves as a catalyst for the development proposals. The Implementation section essentially includes: phasing, the programme, institutional arrangements, action areas and key catalytic projects.

The biggest advantage of the 'Package of Plans' approach is that it enables decisions to be made within the framework, which allows the municipality and developer to gain greater insight into understanding the most critical issues in the area. The development control for the project can also be handled in a more flexible and interactive manner, which will assist with moving larger scale projects more swiftly into the implementation phase (Wilkinson, 1994).

## Structure of the Document

The first 5 chapters are descriptive and contextual and begins with chapter 2, which discusses the generic urban problem in South Africa, the major causes of these urban problems and the spatial consequences for South African cities.

Chapter 3 focuses on the case of Cape Town and the socio-economic and spatial structural issues prevalent in the city. Essentially, chapter 3 attempts to reinforce the higher order argument made in chapter 2 on the urban problems faced in South African cities.

Chapter 4 is based on the study area, Wingfield, and provides an historical and locational assessment of the area and its surrounding context. The need for urban growth management tools is not only contextualised in the South African context but also in the context of the current global challenges.

Chapter 5 Gives direction to the plan by discussing the current global challenges and concludes with the performance criteria, which the plan is trying to achieve, the nature of the plan (model) and the legislative framework.

Chapter 6 commences with the contextual analysis of Wingfield by analysing the sub-metropolitan scale and concludes with a concept at the Sub- metropolitan scale. Essentially the purpose of this chapter is to determine the way in which the site ties into the larger urban systems and its potential role in urban restructuring.

Chapter 7 is based on the scale of the Site and its abutting environs. The chapter provides an analysis of the natural systems and infrastructure. The chapter also includes the structural opportunities and constraints, which serve as informants to the Wingfield development proposals which follow.

Chapter 8 consists of the concept at the site scale and proposes a spatial framework for Wingfield.

Chapter 9 is based on the precinct scale and comprises of a design for one of the precincts identified

Chapter 10 discusses the implementation and phasing for the Wingfield Development proposals.

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## CHAPTER 2

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### The South African Urban Problem

The first part of this chapter will provide an overview of the current urban realities facing South African cities. The second part will discuss the historical (pre-1994) and contemporary management practices (post-1994), which have contributed to these urban challenges. Finally, the chapter will identify the spatial and socio-economic consequences of these urban management practices in order to understand the generic urban problems facing South African cities. This is seen as crucial prior to suggestions being given in terms of management interventions for rectifying these urban challenges.

#### *Urban Realities In South African Cities*

Urbanisation is a relatively new phenomenon for South Africa in comparison with many other countries in the developed and developing worlds. Rapid urbanization and urban growth has mainly occurred over the last 50 years in South Africa. It is estimated that more than 60% of the total population are now urbanized and this figure is increasing rapidly. South Africa is also said to have one of the highest gini-coefficients in the world, which is characterised by the large socio-economic divide and the degree marginalization prevalent in the country. The figure for the year 2011 was 65% (World Bank, 2015). The Gini-coefficient index is a measure of equality based on the level of income distribution in the country with 0% representing 'perfect equality' and an index of 100% implying 'perfect inequality'. Furthermore, the effects of globalisation, the decline of the manufacturing sector and the growth of the tertiary economic sectors has increasingly presented further challenges for the urban poor in terms of finding employment. This points to the disturbing unemployment rate of 25% (Statistics South Africa, 2015), and presents further evidence of the deep inequalities in South Africa. To this end, Smith (2003) asserts that many South Africans have no option but to seek out alternative means of livelihoods through informal self-employment and settlement formation, as they are excluded from many socio-economic opportunities. This is exacerbated by urban in-migration and natural population increases which means an ever growing population of the urban poor (Dewar, 2000).

This has resulted in a situation of South African cities having to grapple with the issue of informal development and meeting the needs of the urban poor with regards to both housing and the economy. These realities are increasing annually.

An implication of these urbanization dynamics is that the rates of poverty, inequality and unemployment are very high and appear to be increasing. In South Africa it has been estimated that the unemployment rate in larger cities ranges from between 25-40%. Additionally because of the historical demographic dynamics, the majority of future urban increase will come from the poorest groups.

The current structure and form of South African cities have been primarily shaped by four major influences: the planning and design ideology of modernism; the political ideology of separate development (Apartheid); informal processes of settlement-formation and rampant private developer domination (Dewar, forthcoming). In order to understand the current spatial patterns in South African cities, attention must be given to the above processes which will be outlined in terms of pre-1994 causes which are based on two dominant ideologies, namely, Modernism and Apartheid and Post-1994 causes which aim to look at challenges beyond the Apartheid City. This will lead to a discussion of the spatial consequences which have arisen as a result of these problems and which underpin the urban challenges that persist in South African cities.

This section aims to outline the causes, which have brought about the urban challenges faced in South African cities today. The first part of this section is based on the 'Pre-1994' causes. The second part of this section will move beyond the 'Apartheid City' to discuss the 'Post-1994' causes of urban challenges and concerns faced in South African cities at present. Lastly, an assessment of the spatial consequences of both the pre-1994 ideologies and the urban challenges Post-1994 will be outlined.

### PRE-1994 CAUSES

#### *Modernism*

The first is the ideology of modernism. Dominant city planning and management systems and policies in South Africa have mostly been imported from the UK, Europe and the US, and have strongly entrenched the urban characteristics of modernism (Dewar, 2000). The planning ideology of urban modernism stemmed from Europe and the USA in the 1930s and rapidly exported to other parts of the world including developing countries, such as South Africa (Dewar, Louw & Povall, 2012).

The urban model of modernism was based on the idea of separation (in particular of live, work, play and movement, including the separation of pedestrian and vehicular movement) in order to reduce conflict. Another feature was a deep rooted belief in the power and ability of technology to overcome social and natural constraints and to transform the nature of society. The most pervasive form of this was the growing dominance afforded to the motorcar (Dewar & Todeschini, 2004). Concerns about technological efficiency were perceived to the virtual exclusion of social or environmental considerations. A particularly prevalent concern became the freedom of vehicular movement. The private vehicle is seen as the primary mode of movement, and settlements were scaled to the motorcar, despite the fact that an increasing majority of households will never own a car (Dewar, 2000).

Furthermore, the basic building block of settlements was seen as the individual freestanding building as opposed to public open space. There was also a conscious de-emphasis of the structural and spatial role of the street- for walking, playing, street based trading and social interaction. Additionally, there was an overriding concern with separation into mono-functional areas.

Under modernism there was also a deep belief in industrialization and the use of mass production and materials of mass production to create new forms suited to the future. In this way it was assumed that the world could and should look the same. The modernist planning model was also expanded to include two other concepts. One of these was the neighbourhood unit-where larger settlements were made up of a collection of smaller discrete neighbourhood units or free standing cells or 'urban villages' surrounded by green space and linked to each other only through rapid transportation. It was believed that this form could capture the best of built urban and rural living as each cell was seen as being relatively 'self-contained' in terms of employment, social and commercial services. From a spatial perspective, the internal movement system of each cell was orientated towards a cluster of social and community facilities at their centres so as to promote a sense of community.

The second concept was suburbia or the single storey freestanding house on its own land parcel. The image was one of a spacious unit associated with the privatization of nature on the erf (the pavilion).

This concept has prevailed despite the fact that erf sizes have been cut to a degree where there are no benefits of 'urban' and no benefits of 'green'. The concept of single dwelling on its own plot of land as well as the separation of urban activities have both contributed to low density sprawl (Dewar, Louw & Povall, 2012:3).

The approach to settlement making under modernism had been strongly based on a rational and comprehensive mind-set. This is reinforced by Dewar and Todeschini (2004) who state that plans were strongly programmatically driven (Dewar & Todeschini, 2004). Within the neighbourhood cells and suburbs, environments became scaled not to the needs of people on foot but by engineering efficiency and safety criteria related to car movement. The emphasis in terms of planning and policy was to maximise the operation of the part: if this occurred, it was assumed, the urban whole would look after itself (Dewar & Todeschini, 2004). Since most urban development has occurred since the advent of modernism, these characteristics are still widely prevalent in South Africa (Dewar, 2000). In this approach to settlement building capacities are calculated, thresholds of different facilities are determined to derive a programme of elements, and planning becomes a more or less efficient and rational without particular concern for a framework which holds the whole together. Commonly, different disciplines make decisions about different elements of structure in virtual isolation from each other.

### *Apartheid*

The second ideology, which has fundamentally impacted on urban form and structure in South Africa and took a number of modernist ideas and grotesquely distorted this, was the socio-political policy of apartheid. In this case the concept of separation of land uses was extended to include separation on the grounds of race (which was not advocated under the modernism paradigm) (Dewar, Louw & Povall, 2012): All racial groups other than "whites" were systematically removed beyond the edges of settlements and in some of the worst cases to distances of over 60-70km away (Dewar, 2000). Similarly, Smith (2003) states that the apartheid city consisted of central and desirable areas reserved for whites, which were surrounded by lower cost but higher density housing for the Indian and Coloured middle class, with the low density uniform zones of basic dwelling units on the periphery to house the black working class. Since there is a direct correlation between race and income, this has meant that the poorest people have been located furthest from agglomerations of urban opportunities (Dewar, 2000).

It was primarily people of colour who were forced to move to the peripheries of settlements. The second distorted concept of the apartheid ideology was that of the neighbourhood unit or cell. Under apartheid, the open spaces which surrounded these cells were not seen as positive spaces providing inhabitants with access to nature (as it had been in the modernist conception), but rather as spatial buffers which increased separation (Dewar & Todeschini, 2004). Smith (2003) reiterates this point by stating that buffer zones which were used to minimize interaction between races and land-uses also contributed to a more sprawling urban footprint (Smith, 2003).

The third distorted concept was that of mobility, the entire system of Apartheid was dependent on high-speed routes linking fragmented parts of the city. The routes sometimes took the form of rail systems but were, more commonly, road-based. These routes were seen as "space bridgers": their sole purpose was to move large numbers of people and goods over considerable distances from one destination to another as rapidly as possible. The emphasis was thus on promoting mobility as opposed to increasing accessibility (Dewar & Todeschini, 2004).

### *Spatial Legacy of Modernism and Apartheid*

The implication of modernism and apartheid has led to three spatial characteristics: low-density sprawl; fragmentation; and separation. These fundamentally characterize towns and cities in South Africa (Dewar, 2000). The low-density sprawling cities spread further outwards on a daily basis in a formless way. In terms of fragmentation, the grain of the urban fabric is coarse, mainly because development occurred in relatively discrete pockets or cells of land, which were frequently bounded by freeways of open space. The human and environmental consequences of these urban structures and forms have been disastrous with agriculture and natural landscapes being aggressively destroyed. Settlements generate enormous amounts of movement and are increasingly unsustainable in terms of energy consumption, infrastructure and pollution.

Poverty and inequality are also exacerbated, as the urban poor are the most affected. The vast majority cannot afford to own a car, which means these communities are placed in a situation that is crippling, inconvenient and expensive. This is, in turn, worsened because public transport is inefficient and often non-existent with many households being trapped in dispersed locations. The limited-access vehicular routes create barriers and reduce opportunities for small income-generating businesses, because of the isolated nature of local markets. Access to community facilities is also subjected to a particular neighbourhood being prioritized, with some being overcrowded and others underutilized.

Overall the quality of public space is poor despite the fact that large numbers of people spend many hours in these spaces because their dwellings are so overcrowded.

Moreover, dwellings and other buildings fail to define, protect or give scale to, the public environment.

Both modernism and apartheid were therefore seen as compatible. The emphasis, which was placed on separation, implied that apartheid planners distorted the scale and concept of the neighbourhood unit (with its cell-like form and limited points of access and egress) as a way of efficiency in terms of security and containing unrest.

### **POST-1994: BEYOND THE APARTHEID CITY**

As Apartheid drew to an end, it was evident that the established spatial patterns of urban form would exist for some time (Smith, 2003). He argues that segregation would no longer be based on racial exclusions, it would now be based on affordability and that little structural change to the apartheid city could be expected. He argues further that "class divisions" would now expand on the racial separation inherited from the past and would produce a city characterized by what has been referred to as "deracialised apartheid" (Smith, 2003:30). In addition, the post 1994 period in South Africa has also been characterized by mismanagement on the part of urban planning professionals as well as the policy and institutional complexities, which have meant that any strong move toward an integrated urban management model becomes increasingly difficult.

### *Informal Settlement Formation*

Because of the inflexible apartheid policies of segregated development and the inability of the state to meet the rising demand for housing, the extent of informality in South African cities is increasing. This situation is worsened by rapid urbanisation and rising unemployment.

Informal settlement formation comprises of two different types of process. The first is land occupation and backyard shacks and the second is illegal occupation of land parcels (both public and private but more commonly public) and which often occur beyond the city limits.

The reason underpinning the processes of informal settlement formation area are commonly based on the fact that it represents the cheapest and only entry point into the housing markets (Dewar & Todeschini,2004). The dominant locational reasoning of these settlements is due to land availability or the desire by occupants to avoid harassment by authorities.

Informal settlement formation has increasingly shaped the form of the evolving city structure as opposed to being a response to it (Dewar, forthcoming).

#### *Policy and Institutional Intricacies*

There are a number of issues with regard to the spatial planning policies in South Africa, which are preventing any meaningful spatial integration and which are increasing the fragmented nature of South African cities. Firstly, institutional practices and market forces reinforce spatial divisions, which has costly implications especially for the urban poor, who constitute the majority of the population, and the wider urban economy and society. Broad statements from policy makers about the need for urban integration are not being translated into consistent action due to a lack of political will and institutional capacity (Turok, 2001).

The second issue relating back to the beginning of the post 1994 period which saw a frantic era of policy formation in the form of Green and White papers and legislative frameworks relating to urban development. There was a lack of integration between these pieces of legislation and cumbersome and multi-dimension developmental approval processes resulted (Dewar & Todeschini, 2004). The vast amount of "red tape" hinders the transformative processes towards integration. Furthermore, the fact that South African planning authorities use mono-functional planning mechanisms for land use such as "zoning" as a primary tool to regulate urban management, reinforces the notion. These are seen as prescriptive and technical and stem from the rational comprehensive approaches to planning, which have failed to create more integrated and vibrant cities. Dewar & Uytendogaardt (1991) argue that institutional complexities in terms of urban management in South Africa result from the fact that different line-function departments operate as isolated silos, with little integration taking place. As a consequence, while the rhetoric has changed, there is little operational change. There is also no clear understanding of the implications of the transformed urban paradigm.

Institutionally, post-apartheid urban policies have contributed to urban fragmentation. In a similar way, Pieterse (2009) reinforces

this argument by stating that the contradicting and competing roles of sectoral policies, such as, transport,

housing, primary health care, economic development are driven by powerful national government departments who often operate in silo's and are not well integrated with one another.

#### *Private Developer-led investment*

The advent of economic globalization and neo-liberal policies has seen a change in the land management system, to one that is market-driven and profit-focused. The first of these changes is that an application for change by a developer is considered as evidence of market and social demand. The second is that developers no longer have to show that the proposed development brings about greater public good, but only that it does not worsen the status quo. Thus the onus of proof has switched from the developer to the local authority. This has led to a situation that is characterized by developer greed rather than social need.

The market for land development is also increasingly national and international rather than local. This has implications from a spatial structural perspective as spatial development has become increasingly reactive and fragmented (Dewar, forthcoming). This has also seen a transition in public investment focus on new developer initiatives, which in most cases are beyond the existing urban edge as, in order for developers to maximize their profits they usually seek out the cheapest land available. This is normally beyond the urban edge, which has led to extensive urban sprawl, loss of arable and wilderness areas and spatial fragmentation as private developments usually take on the suburban form of development.

This contributes to continuing settlement inefficiencies and an increased demand for infrastructure and social facilities. Turok & Watson (2001) assert that in the post-apartheid years, even though local plans and policies aimed to create integrated and equitable urban areas, private investment, in both the service sector and in up-market real estate, avoided the poorer areas (Turok & Watson, 2001). Private investment has grown in affluent suburban areas, which benefit from freeway access and attractive scenic views (e.g. sea fronts) as well as centralized locations for shopping malls, industrial and business parks, and residential developments.

This has resulted in an increasing divide in terms of economic and social development in South African cities and fragmentation, which increasingly presents difficulties for the poor to access these opportunities illustrates the way in which public investment continues to be concentrated in high income areas while low income subsidized housing is focused on low income areas (Turok, 2001).

Private sector development has essentially driven by the following concepts, as indicated by Turok (2001: 2358- 2360):

-Decentralisation: In this instance economic activity has shifted from the traditional CBD towards suburban centers or decentralized nodes, such as Claremont and Century City in Cape Town and from Johannesburg CBD to Sandton in the case of Johannesburg.

- Deconcentration: which involves a net shift in economic activity away from established centers towards a more dispersed pattern of development.

- Differentiation: Differentiation refers to the growing tendency for economic centres to specialize in different market segments. This is most apparent in retailing and consumer services, where the major centres focus more on different population groups, for example, those who fit their market profile.

#### *Housing Policy*

The South African housing policy still promotes one-house-one-plot housing typologies with mono-functional separation of land-uses. Many low-income settlements provide evidence of this as they take the form of a sprawling, non-differentiated "blanket" of housing, a lack of integration between dwellings and street space and fundamentally a total lack of concern about urban space. Furthermore, dwelling unit densities are low, to the extent that there is little trading or small-scale economic activity. This constitutes to a sterile, fragmented and inhumane environment (Dewar & Todeschini, 2004:25). This is clearly non-sustainable and is receiving increasing attention. This argument is reinforced by the National Planning Commission (2011) who recognizes the need for settle restructuring as well as the influential 'Braking New Ground' document (2004) which calls for fundamental changes to the settlement structure (Dewar, Louw & Povall, 2012).

This is reinforced by Huchzermeyer (2001) who states that the most commonly applied version of subsidized housing in South Africa requires home-ownership of a standardized housing unit which is translated into large-scale developments of uniform, free-standing houses in a standardized township layout, located on the urban periphery. Thus it is clear that the housing policy in South Africa reinforces the apartheid low-cost housing suburban model, which results in low-density urban sprawl, separation and fragmentation. Capital subsidy schemes also usually fall short of providing dignified housing with reasonable living space and privacy (Huchzermeyer,2001).

## THE STRUCTURAL OUTCOMES OF THESE PATTERNS: SPATIAL CONSEQUENCES

The above processes have resulted in a number of overarching patterns, which, collectively, underpin the wide range of environmental and spatial issues being experienced in South African cities.

### *Large amount of movement*

The system generates an enormous amount of movement as a result of the sprawling low-density urban patterns inherent in South African cities. This has inhibited the provision of a viable, efficient and widely accessible public transportation system, for example, the pattern of low-density urban sprawl makes larger capacity fixed-line movement such as rail frequently non-viable (Dewar & Todeschini, 2004; Dewar, Louw & Povall, 2012). Another issue resulting from the distorted entrenched urban patterns of urban opportunities and the sprawling nature of urban growth is that it militates against pedestrian movement. Since most of the movement generated is primarily road based and based on the private-vehicle it presents the worst possible situation in terms of greenhouse gas emissions. The large amount of vehicular movement generated is associated with increasing traffic congestion, especially at peak hours. It also has as well as environmental implications in terms of air, water pollution and energy depletion (Dewar, forthcoming; Dewar & Todeschini, 2004). This has resulted in a focus on maximising mobility rather than increasing accessibility by bringing people into closer proximity and therefore reducing aggregate amounts of movement. In this way the concept of the urban freeway has been warmly embraced in South African cities (Dewar,2011).

### *adequate provision of social facilities*

Densities are also too low to support adequate levels of social facilities. This is aggravated by the use of the neighbourhood unit concept, where each cell is dependent on its own internal resources for social and commercial support. Levels of support are particularly low for the urban poor. There are difficulties in accessing essential services in other cells as these facilities tend to be embedded rather than exposed. Demographics also play a role in the delivery of social infrastructure and facilities: when the demographic structure of the cell changes over time, the demand for facilities changes. This explains the phenomenon of some facilities being overcrowded whilst others remaining underutilised in South African settlements (Dewar,Louw & Povall,2012). A related consequence is the inefficiencies of investments in social infrastructure. There is little co-ordination between investments in social infrastructure and other elements of urban structure, particularly public transport. As available resources decrease relative to the scale of demand, it results in a situation where there are increasingly winners and losers and social tensions are heightened.

### *Lack of vibrant local markets*

The skewed urban form and low densities prohibit the creation of vibrant local markets which are pre-conditions for the emergence of vigorous growth in micro and meso self-generated economic activity and for the diversification of urban economies (Dewar,Louw & Povall,2012). This is a concerning situation at a time when structural unemployment is increasing globally and where more households will have no option but to generate their own livelihoods in the future. The system also generates limited opportunities for small business generation. This is largely because of diffused and diluted thresholds (Dewar, forthcoming).

### *Environmental and Resource Depletion*

The patterns of low density urban sprawl has also resulted in the large-scale destruction of arable land and land of high amenity (Dewar,Louw& Povall,2012). It has been estimated that the rate of loss of agricultural land to development in the CTMA between 1985 and 1995 amounted to approximately 1.8 hectares per day (Gasson, 1995,cited in, Dewar, forthcoming). It is often the unique and desirable natural landscapes that are targeted by the wealthy, largely privatizing amenity and often reducing that amenity in the process. Air pollution to which vehicles are a major contributor (ibid.) is reaching alarming and dangerous levels in larger cities in South Africa. Vehicular emissions are hazardous to human health and negatively impacts on environmental dimensions such as water and air quality (Dewar & Todeschini, 2004).

### *Poor public spaces*

The quality of the public space is also poor. Many environments degrade people's dignity and are increasingly difficult and expensive places to maintain (Dewar, forthcoming). These spaces are particularly important in the lives of the urban poor. A characteristic of poverty is that people cannot carry out all their daily activities in private spaces, and thus public spaces operate as extensions to the private dwelling unit (Dewar, 2011). The application of the mono-use suburban neighbourhood unit concept promotes a pattern of sterile uniformity as opposed to urban identity. This presents a further concern in terms of access to nature, which the sprawling form denies, for example, the small open spaces within and between low income communities are poor substitutes for real contact with nature. Because of the need for a high degree of maintenance and insufficient financial resources, these are actually negative spaces. The discrete social form and inherent nature of facilities mean that there is little or no reinforcement of one area by others in terms of convenience of access to social facilities. Resources available to support the provision of social infrastructure in low-income areas are often adequate (as in most developing countries)

Low-density urban sprawl also contributes to a sense of monotony and standardization. This is evident in low-cost housing settlements located on the periphery of South African cities, which has resulted in a non-differentiated blanket of freestanding houses without any consolidation for urban design. This has led to sterile and hostile urban environments, which are bleak wind-blasted landscapes, with no visible landscaping or vegetation. Frequently there are also freestanding community facilities with no enclosed and defined public space. Furthermore, there are limited access routes with huge road reserves and a lack of integration between dwellings and the street space, which further serve to divide communities on either side of the route. This has resulted in a situation that is not pedestrian friendly and a total lack of concern for urban space (Dewar & Todeschini, 2004).

### *Increasing poverty and informality*

The result of the skewed urban form found in South African cities is an "inconvenient and expensive place to live": they contribute to increasing poverty, inequality with the poor being the most affected (Dewar, forthcoming: 6). Often it is these communities who are faced with harsh choices. On the one hand, transport costs assume a disproportionately

high amount of household budgets and, on the other; many households are unable to afford the purchase prices of vehicles. This presents a situation where many households are literally trapped in a poverty trap and are unable to travel to seek out employment or experience opportunities in the city. The settlement forms in South African cities are therefore significantly exacerbating the key societal problems of poverty and inequality, which underpin most development challenges faced in the country. Roy (2005:150) finds that the limitations of urban upgrading are policy approaches that focus on the "aestheticization of poverty". This equates urban upgrading with "aesthetic upgrading" rather than the "upgrading of livelihoods". Roy (2005) adds, that in this approach what is redeveloped, is space, the built environment and physical amenities rather than people's capacities or livelihoods. Although South Africa is not alone in facing problems associated with sprawl, fragmentation and separation, these issues in South Africa are amongst the worst in the world. This is reinforced by a United Nations review of world cities which found that South African settlements are the most inequitable and inefficient in the world (Dewar, Louw & Povall, 2012).

The challenge facing urban decision makers is therefore to restructure settlements at a variety of scales in order to make them more "efficient, equitable and sustainable" (Dewar, Louw & Povall, 2012). This requires densification, intensification and diversification around strategically significant lines and points, for example, intensification around clusters of existing opportunities, reinforcing corridors which multiple modes of transportation and reinforcing public transit stops. Furthermore it requires the diversification of small and micro-enterprise economies.

It is clear that urban settlements in South Africa are not responsive to the economic realities of the majority of people: in this sense, they are non-sustainable. A reason for this is that

spatial constraints in South African cities are so difficult to overcome (Dewar & Todeschini, 2004). If any significant

improvement in urban performance is to be made in the future it will depend on the following interrelated characteristics, proposed by Dewar and Uytendogaardt (1991):

-The compaction of settlements to contain lateral sprawl;

-Significant increases in densities to provide greater levels of support for economic and social opportunities and to create vibrant local markets as a pre-condition for small-scale

economic activity;

-Intensification along more continuous movement routes to ensure greater viability of public transportation and non-motorized transport (NMT);



Figure 1: Low density suburban sprawl in South Africa  
(Source: Tonkin, 2008)



Figure 2: The limitations of apartheid planning in Cape Town  
(Source: <http://www.capetownpartnership.co.za>)

## CHAPTER 3

### LOCATING THE URBAN PROBLEM: THE CASE OF CAPE TOWN

The City of Cape Town (COCT) is known well renowned for its incredible natural beauty. The city's natural environment includes a 294 km coastline (City of Cape Town Statistics, 2012) and the Table Mountain National Park within its boundary, making it an attractive place to live and work. Furthermore, much of the city's economy and growth is supported and underpinned by its natural beauty and heritage, which has resulted in a significantly growing tourism industry. The city is also located within one of the world's six plant kingdoms, the Cape Floristic Region (CFR), a recognized UNESCO world heritage site and the most biologically diverse of all plant kingdoms. The CFR is also a global "biodiversity hotspot": because of its high proportion of endemic species.



Figure 3: Cape Town location map  
(Source: Author, 2015)

### ENVIROMENTAL DEGRADATION

In the case of Cape Town, low-density urban sprawl has had a particular impact on the outskirts of the city and has contributed to the loss of large amounts of valuable agricultural land, long-haul commuting times, increasing pollution and the loss of some natural resource areas and cultural landscapes. Most of the city's growth has also occurred incrementally and haphazardly, often uninformed by considerations of where urban development could go with minimum effort and expense, as opposed to where it should not go. The result of this has been a rapid sprawling of urban development "riding roughshod" over rural and wilderness landscapes and all ecological considerations (Dewar, forthcoming: 44). This essentially implies that the radial pattern and expansive outward growth of urban development is destroying the valuable agricultural land and undisturbed wilderness areas located on the outskirts of the metropolitan region. Similarly, Gasson (2007) reinforces this argument by stating that the accelerating rate of conversion of agricultural and beautiful wilderness lands to urban and sub-urban conversion is fundamentally because of contemporary extensions, which take the form of dispersed, and sprawling footprints (Gasson, 2007). Evidence points to the fact that urban growth in Cape Town has consumed large amounts of valuable agricultural land, for example, between the year 1993 and 1998, 2,4 hectares of agricultural land were lost per day, because of urban development (Watson & Turok, 2001).

Decisions about the location of urban development are also consistent with the pattern of hazard-prone and resource-rich areas. This has implications for physical safety in terms of hazard prone areas as well as human survival, which is undermined if resource rich areas are destroyed (Gasson, 2007). This also has major implications for future food security, ecological biodiversity and the rights of the urban poor to access nature (Gasson, 2007). Watson and Turok (1998) reiterate this point by stating that sprawling development generates major environmental externalities which makes inefficient use of land through excessive quantities of resource consumption that may have value for agriculture, minerals, aquifer recharge potential and biodiversity.

In the context of Cape Town middle and upper income housing are largely responsible for sprawling outward expansion, while low-income and affordable housing tend to concentrate on the Cape Flats and the southeast metro, including some environmentally inappropriate places. The overcrowding in the majority of the informal settlement also poses major health and safety threats. The South-East Metro is frequently exposed to high velocity winds and which are subject to flooding and many of these settlements are located in flood prone areas and do not have access to sufficient basic services. Often, it is found that initial infrastructural plans for these settlements have inadequately prepared for migrant influxes and the subsequent impact on storm water drainage and sanitation. Govender, Barnes and Pieper (2011) state that storm water systems in low-income settlements in Cape Town are often used for the disposal of unwanted wastewater and solid waste. Apart from the flooding because of blocked storm water systems, this has other major consequences, such as, the contamination of rivers flowing past urban areas, with widespread implications for the pollution of surface water in the city and for future water resources and environmental health.

The overcrowding conditions and lack of access to safe energy sources also poses great fire hazards in these informal settlements (Govender, Barnes & Pieper, 2011). Furthermore, the lack of adequate and timely removal of solid waste causes seepage from bins and bulk rubbish containers, which worsen environmental pollution (Govender, Barnes & Pieper, 2011).

These factors present considerable challenges for a region, which is dependent on its natural resources, and in particular for the tourism sector of the economy which is drawn to its beauty, agriculture and unique biodiversity. Urgent attention needs to be given to the management and integration of urban and natural fabrics in the backdrop of the risks posed by resource degradation and climate change to ensure environmental and economic sustainability (COCT, 2008).



Figure 4



Figure 6: Fires are high risk hazards in informal settlements in Cape Town as a result of the strong south-easterly winds and dry summer climate in the city  
(Source: <http://westcapenews.com>)



Figure 5

The extent of seasonal floods in the Cape Flats  
(Source: <http://groundup.org.za>)

## SOCIO-ECONOMIC INDICATORS: DEVELOPMENT PROBLEMS AND CHALLENGES

In the context of the global south, and like much of the developing world, the CTMR is characterised by rapid urbanisation from population growth and rural in-migration. More specific to this particular context is spatially fragmented inequality perpetuated by the segregatory and oppressive policies of the apartheid state. This has resulted in a situation where low-income communities are located on with the peripheries of economic hubs and are often disadvantaged in terms of accessibility to the economic and social arenas of the city. Poverty and unemployment levels continue to rise while government lacks the fiscal and administrative capacities to cope with the burdening demand for basic services.

The City of Cape Town is considered to be the tenth largest city in Africa. It has current total population of 3 860 589 (COCT, 2014). Furthermore, the city is experiencing rapid population growth which is estimated at a rate of 2,57% annually (2001-2011) (STATS SA, 2011). The total population of the city constitutes 64,12% of the Western Cape's population. The table below represents the demographic statistics for the CTMA

DEMOGRAPHICS		YEAR
Total area	2,461 km <sup>2</sup>	2012
Total Population	3 740 025	2011
Number of Households	1 068 572	2011

Figure 7: Key Demographic Statistics for the City of Cape Town  
(Source: City of Cape Town Statistics, 2012)

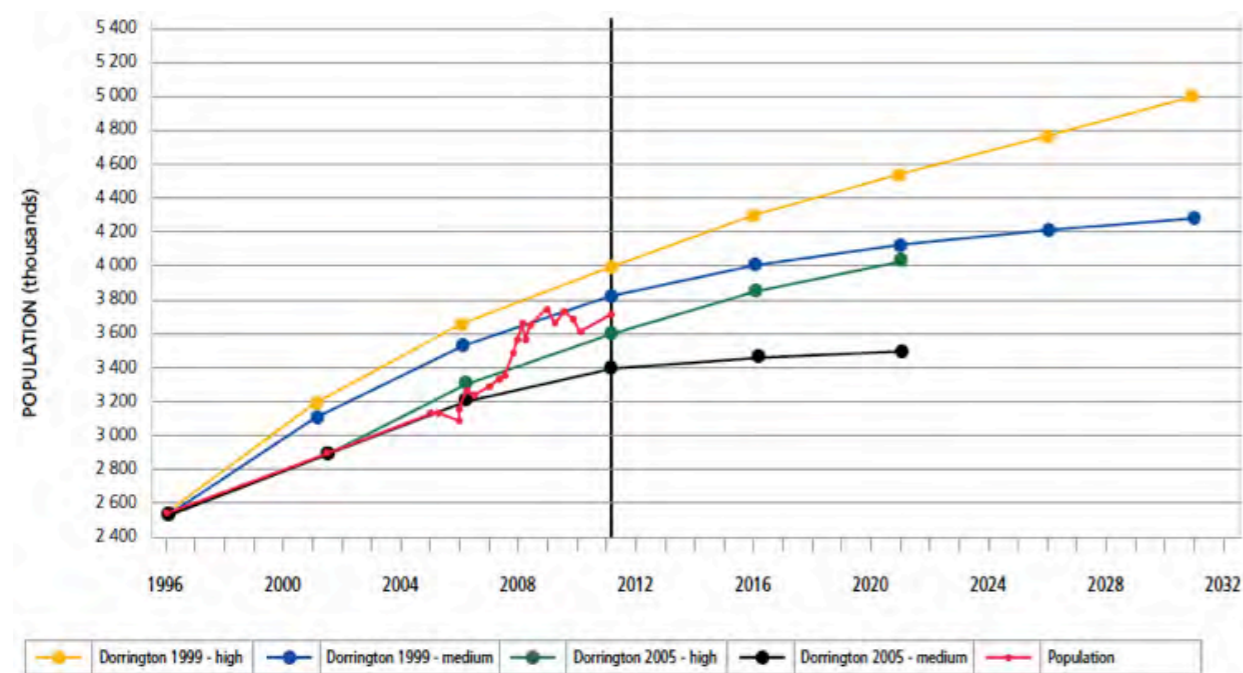


Figure 8: Population growth scenarios based on low, medium and high migration rate projections: 1996-2032  
(Source: Cape Town Spatial Development Framework, 2012).

The city's population is expected to continue growing significantly as a result of two dynamics: natural growth and rural-urban migration. Dewar et al (1995) reinforce this view by stating that the demographic and socio-economic tendencies resulting from patterns of natural increase in both rural areas and the cities is that the population is becoming rapidly younger and poorer. By far the greatest proportion of growth, which occurs from both natural growth and in-migration, is amongst the poorest people (Dewar & Uytendogaardt, 1991). Migration is also a significant dynamic as it is driven by a perception of improved life chances and the prospects of finding employment or generating livelihoods (Dewar et al, 1995). Figure 8 below presents the future population projections for the CTMA.

As a result of the sprawling, fragmented and segregated nature of the CTMA's urban form as well as the socio-economic demographical implications, highlighted above, the economic pattern prevalent in the city is reflective of one that is structurally dispersed and decentralized. Urban sprawl in Cape Town occurs mostly in the directions, which follow the main development corridors, as shown in figure 9.

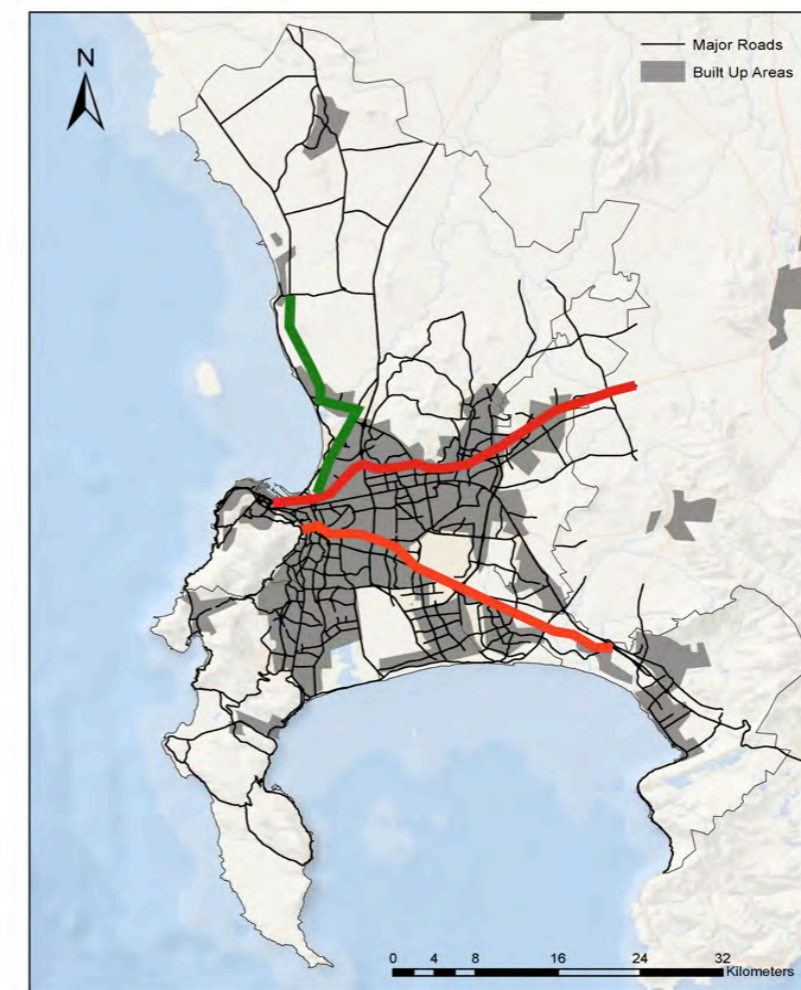


Figure 9: The Cape Town Metropolitan Area with its major growth axes  
(Source: GIS Technical Library, University of Cape Town)

Although linear corridors like Voortrekker Road, Durban road and Main Road exist much of the activity is more nodal across the city (Cape Town, 2012). Investment is mostly private and geared on generating profit. Expenditure towards social goods and results in the divergent development phenomenon where marginalized areas remain unable to attract much needed investment while affluent areas become ever more insulated (Watson, 2012). The finance, insurance and business services sector is clustered in the CBD and other large commercial centers, including Bellville/Tyger Valley, Century City and Claremont/Newlands. This emphasizes the limited number of points along limited access movement routes that operate as "space bridgers" to these routes rather than 'space integrators' (Dewar & Uytenbogaardt, 1991).

This serves to reinforce widespread poverty, inequality and unemployment in the metro south-east and poor areas located on the outskirts of the city (Dewar, forthcoming). The high levels of unemployment and the educational mismatch between available and needed skills remain the key economic challenges in the city.

Coupled with Cape Town's rapid population growth is the growing proportion of the aged and youth relative to the total population. This is mainly because of the impact of HIV/AIDS (COCT, 2006). This has specific spatial requirements, as an increasing aging population may need appropriate social and healthcare facilities, and increase in child-headed households presents further socio-economic implications and furthermore, mechanism will have to be found to effectively engage the large proportion of youth through sport and other recreational activities.

## URBAN STRUCTURE AND SPATIAL FORM

### *Sprawl, Fragmentation and Separation*

Cape Town's urban structure is characterised by the dominant physical patterns: which include, low-density urban sprawl, separation and spatial and structural fragmentation. It has a coarse grained urban fabric, since development occurs in relatively discrete pockets or cells which are frequently bounded by freeways or buffers of open space. This is primarily because of the relatively unquestioned management belief in the introverted "neighbourhood unit" concept, in which housing areas focus inward on community facilities, imbedded at their geographical centres. In terms of more formal housing developments, this relates to the tendency to undertake new housing developments as large entities on discrete consolidated sites. In essence, these pockets of development operate in relative isolation. They are linked by freeways and other limited access forms of movement, which bring few benefits in an urban structural sense. Freeways and other forms of high-speed, limited access infrastructure are spatial barriers, rather than integrators. They emphasize a limited number of points of accessibility only (at points and at intersections with other routes in particular) (Dewar, Louw & Povall, 2012).

These overarching issues are constantly being reinforced and aggravated by rapid urban growth and inappropriate urban management practices and policies to manage this growth. Associated with these residential patterns is the tendency to develop inwardly oriented shopping malls, which are accessible only by private modes of transport. There is also the decentralization of retail and business to separate private entities which are seen in the increasing movement of businesses out of the inner city to places like Canal walk. This is emphasized by Turok and Watson (2001) who note that the economic pattern of the city follows a more dispersed and decentralized pattern from the city core to suburban centers and new office and retail parks along major freeways of the city.

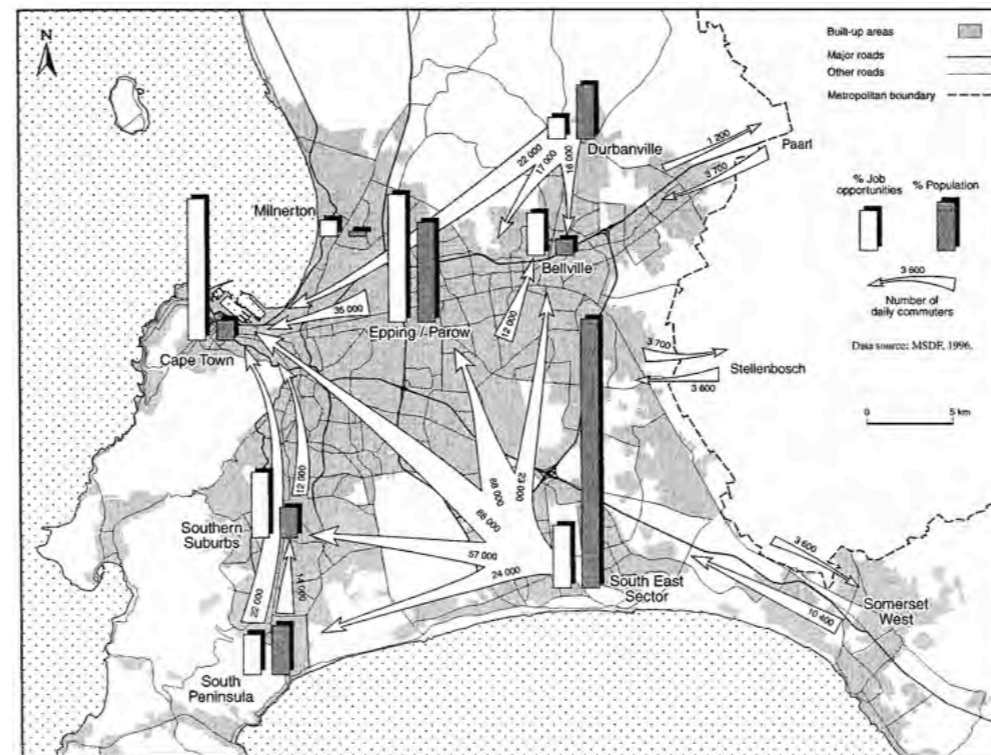


Figure 10: Mismatch between places of work and residence in Cape Town in 2001 (Source: Turok 2001)

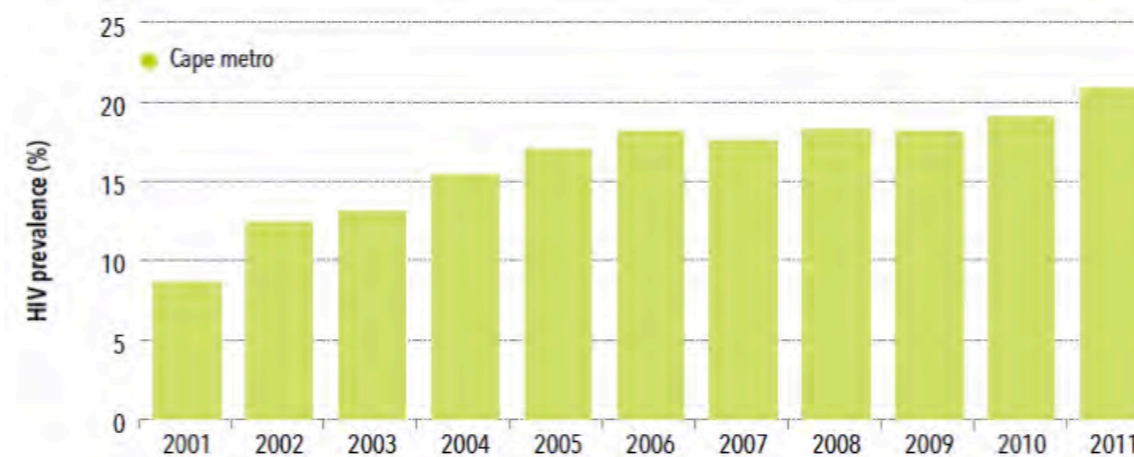


Figure 11: Cape Town HIV prevalence trend, 2001-2011 (Source: COCT, 2014)

## Movement

The current radial rail and road networks has resulted in limited north-south linkages and a movement system which does not fully accommodate the multi directional movement patterns of residents which has inevitably emerged from urban sprawl and dispersed economic activities. Members of middle and higher income households situated in wealthier and sometimes conveniently located suburbs have acquired and routinely use private vehicles rather than public transport. Moreover, the current public transportation systems are inefficient, overcrowded and unsafe. Without a functional public transportation system Cape Town residents are forced to use private vehicles, which has caused increased road congestion (City of Cape Town, 2012). This is reflective of the significant disparities in terms of mobility in the city and an over-emphasis on the car.

Provision of NMT modes –predominantly walking, and much less significantly, cycling has been limited to conventional sidewalk and pedestrian crossing facilities in most areas as well as the establishment of some limited and disconnected cycleway routes. The dualistic structure of the passenger transport system is both reinforced by and results from a legacy of socio-spatial segregation inherited from apartheid urban planning practices. Members of lower income households, predominantly situated in the peripheral townships and informal settlements constitute the majority of public transport users in the city. This is coupled with the long-haul travel times as well as transport expenditures and issues of affordability (for example, lower income households, or those earning less than R500 per month- commit as much as 35 % of their total income to meeting basic transport costs (Swilling & Davidson, 2010). The city's spatial structure of sprawling, low-density development patterns together with geographical eccentricity of the historical core area which accommodates a large proportion of economic activities and employment opportunities thus imposes long average trip lengths on much of the population, especially the lower income people living in the metropolitan south- east sector and in the dense informal settlements.

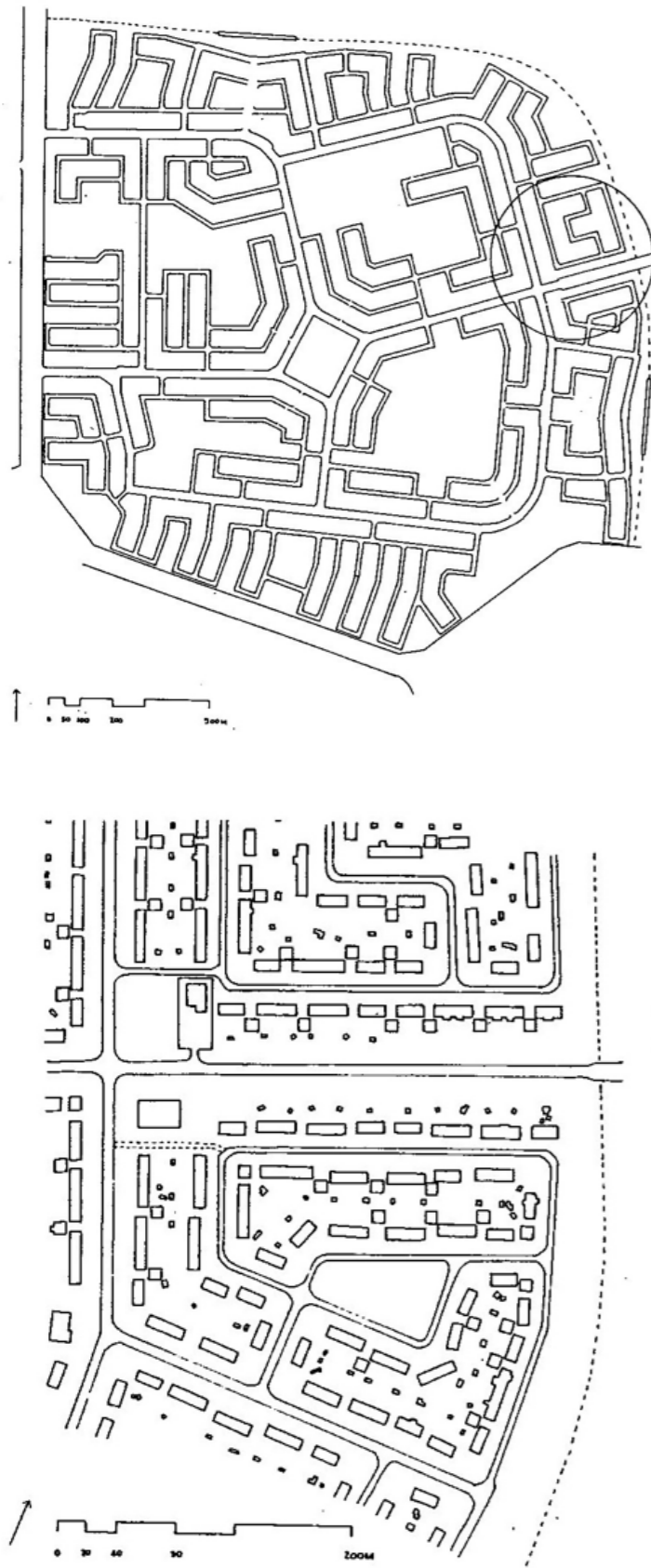


Figure 12: Bonteheuwel in the Cape Flats shows the monotonous layout of a low-intensity urban environment which that are not integrated into the larger movement system but instead face inwardly.  
(Source: Dewar & Uytendogaardt, 1991)



Figure 13: Percentage of Private and Public Transport Use in Cape Town (Source: Author; Data: CoCT 2011)

## Housing

### Planned Housing

Despite the fact that national, provincial and municipal policies support and encourage sustainable human settlements, both public and private sector continue to roll out inappropriate urban form.

The private sector delivers 8000– 15000 dwelling units per annum depending on the economic growth rate (COCT, 2012). The wealthier income groups in Cape Town continue to build unsuitable and dispersed developments on greenfields that should remain productive land in the urban economy. Examples of this tendency can be seen in the subdivision of large plots in Constantia and Durbanville and beyond the urban edge (Swilling & Davidson, 2010). The expanding locations for middle-and high-income housing is also usually being built within exclusive gated communities surrounded by high walls.

However, in terms of subsidized housing, the city only delivers 6500-7000 units per annum which is considered below the delivery rate required to keep up with new household formation and in-migration, as well as to reduce the housing backlog. The current housing backlog was estimated to be 221 200 units in 2014 (COCT, 2014; COCT, 2012). Informal housing is also relatively dense and are inadequately supplied with potable water supply, sanitation, solid waste management, wastewater and run-off management, education and healthcare (Swilling & Davison, 2010). The vast majority of all subsidised formal housing projects have been built on low cost peripheral land in places such as Phillipi and Delft.



Figure 14: Individual dwelling units/Free-standing, single storey units on the Cape Flats in Cape Town characterize the generic approach to low-cost housing developments (Source: <http://www.livingneighborhoods.org>).

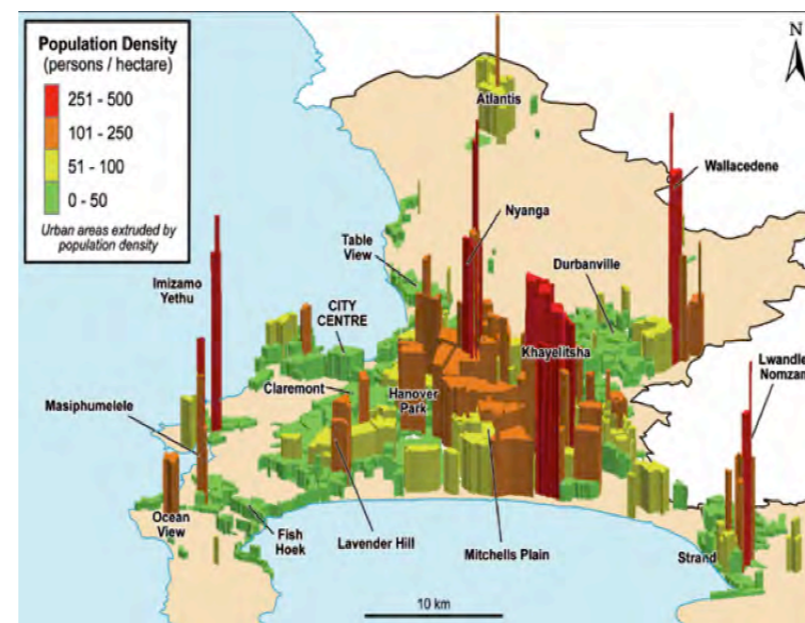


Figure 15: Residential Population Densities are highest in the South-East Metro in Cape Town (Source: COCT, 2012)

### Unplanned/Informal Housing

The bulk of informal housing (backyard and freestanding) is situated in the south-east metro. In this case the housing market is considerably weak and non-existent in large parts of the area because of low disposable incomes, uncertainty over property rights and lending restrictions by financial institutions (Turok & Watson, 2001). The city's largest informal settlements are still located areas such as Khayelitsha, which has 13 informal settlements and contains 42170 shacks and Philippi which has 23 informal settlements and contains 15 114 shacks.

### Spatial Quality

The socio-economic divide is not only apparent in the dispersed and segregated nature of settlement in Cape Town, but also in relation to the fact that the majority of households residing in low-income settlements are living in poverty and increasingly high densities. Formal housing in these areas, which are built in a standardised, focus mostly on the quantity rather than the quality of the dwellings and its interaction with the public realm. Because of the limited resources and inappropriate planning, urban design and architectural performance by urban management professionals, the spatial quality of informal settlement upgrades and low-cost housing developments in various parts of the city, are largely sterile and inhumane. As stated by Dewar & Todeschini (2004: 25) the dominant impression of low-income urban housing projects is one of "bleak wind-blasted landscapes, with little or no vegetation, blanketed by non-differentiated free standing little houses". Furthermore there is no defined or enclosed public space, and poor quality roads that cut off communities on either side of the route. This presents a lack of integration between dwellings and street space and a lack of concern for urban space.

This section attempts to analyse the interrelated socio-economic and structural issues, which exist in the CTMA, in order to understand the structural problems and challenges that exist from a broader and more holistic perspective. This is crucial before commencing with restructuring interventions at the site scale.

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## CHAPTER 4

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### GIVING DIRECTION TO THE PLAN

Prior to a discussion on strategic urban growth management practices, it must be understood what gives direction to these practices, to create positive urban environments. The previous chapters have indicated the extent to which major South African cities, such as, Cape Town consist of their own socio-economic and spatial structural problems. The future of these cities will also be fundamentally influenced by the future of South Africa as a whole, as well as environmental and economic development which takes place at a global scale. This increasingly necessitates the need for planning to take into account more than just local factors. It also requires attention to be given beyond this context by responding to global trends which are external and beyond the control of the city. This section address three sources which give direction to urban management: Emerging international tendencies; generic performance and value based qualities and the South African legal planning framework. This section essentially aims to give direction to the plan and determine the qualities which the plan is seeking to achieve.

### INTERNATIONAL TENDENCIES

There are a number of emerging global challenges that need to be addressed in spatial plans.

#### *Global Population Growth and Urbanisation*

The 2009 Annual UN Habitat report stated that in 2008, for the first time in history, more than half of the world's population lived in urban areas. It is expected that by 2050 this will have risen to 70%. (UN Habitat,2009). Many towns and cities in the developing world are experiencing rapid population growth which is absorbing a large amount of rural-urban in-migration as a result of agricultural transformation, rural unemployment with many of the urban poor looking for a foothold in towns and cities where land is more easily available where there is a possibility of combining urban and rural livelihoods and the increasing proportion of young adults (Watson,2009;UN Habitat,2009).

The major problems associated with these rapid rates of urbanisation in the developing world, are the local economies in these cities, natural resources and governmental systems with limited capacity to accommodate the rapid rates of urban population growth. This results in major outward expansion

because of cheap and unregulated peripheral land which inevitably result in urban sprawl, structural unemployment and inequalities which are reflected in the growing differences between the wealthier and poor areas, environmental degradation and poverty (UN Habitat, 2009) To this end, city planning should be geared towards development that focuses on the needs of low-income populations. It should also be concerned with implementing innovative planning solutions that deal with these poverty-related issues through effective land-use planning and mobilization of resources and capacity building. Thus it is argued that urbanisation should not be perceived as a problem, but more of a positive and natural process: "Urbanization should be seen as a positive phenomenon and a pre-condition for improving access to services, economic and social opportunities, and a better quality of life for a country's population" UN Habitat (2013:11).

### RESOURCE DEPLETION AND ENVIRONMENTAL THREATS

#### *CLIMATE CHANGE*

One of the most threatening environmental challenges that we face on a global scale is climate change. Much has been written about regarding this topic and it is usually based on examining the extent to which human activity is responsible for contributing toward global warming. Solomon (2007) reinforces this by stating that it is very likely that the increase in global temperatures are linked with increases in human-generated greenhouse gases emissions. Others have emphasized the extent to which threats of climate change has begun to assert itself in the form of intensive weather conditions, such as, flooding, droughts and storms which has resulted in devastation world wide (Satterthwaite, et al., 2010). The fact that many cities are located in low lying and coastal areas therefore presents major implications and vulnerability to sea level rise and increasing flooding. The real threats which have an impact on future generations is that of food and water insecurity which will affect cities across the globe and requires urgent attention in planning decisions.

The promotion of compact cities and the regulation of urban sprawl through densification strategies, land market regulations, reduction in the cost of infrastructure and the demand for transport and limits to the footprint of an urban areas are all strategies which can effectively address the challenges of climate change (UN Habitat,2015).

#### *Water Security*

According to Vörösmarty et al (2013) the pressures which are exacerbated by climate change on the global water supply are leading to a large portion of the global population experiencing "water stress". Some areas have also been experiencing an increasing amount of droughts whilst others are witnessing the occurrence of

frequent floods. These hazardous pressures impact on global water security and make future management of the global water supply crucial. Currently water management is focused on the construction of large engineered dams that pump water over large distances in order to reach drought prone areas. This approach is extremely costly and in some cases worsens the problem as these dams are losing millions of liters because of surface evaporation and pipe leakages. Provision should therefore be made for initiatives such as local water capture and conservation of existing water resources, grey water recycling and effective water demand management strategies which aim to protect existing water sources against pollution and thus ensure sustainable future water security. Water is an essential human need, and critical in all areas of life, such as, for the production of food and industrial processes as well as for personal hygiene and ecological systems.

#### *Food Security*

Gergory et al (2005:2139) refers to the food system, which underpins food security, as "all of the dynamic interactions that take place in the biophysical and human environments which inevitably lead to production, processing, distribution, preparation and consumption of food". External forces, which include climate change, urbanization and global population growth places, stress upon these various food systems, diminishing global food security. Gergory et al (2005) states that the food systems encompass a variety of factors, such as, food availability (production, distribution and exchange), food accessibility (affordability, allocation and preference) and food utilization (nutritional and societal values and safety). These factors make it as much an urban issue as it is a rural issue, as it emphasizes the importance of the above mentioned factors in inducing food insecurity. The issue of climate change has also led to more extreme seasonal conditions, which is having a detrimental effect on agricultural processes as the hotter and drier months impact on crop production. The issues of food security and its relationship to agricultural produce are further impacted by the on-going conversion of agricultural land into urban development on the peripheries of cities in an attempt to accommodate rapid urban growth. The increased scarcity of food produce leads to price inflation, which brings about a number of social issues as it is the urban poor who are unquestionably the most vulnerable.

"Food access" is a fundamental aspect in terms of the global food security debate. There are sufficient net global food supplies, and some regions will experience an increase in productivity as a result of global warming (Gregory et al., 2005). It is, however, the accessibility to these supplies, especially by areas that experience greater negative pressure from climate change, that are causing many Global South countries to experience situations of famine and food shortages. A further issue that relates to food insecurity in many global south countries involves agricultural subsidies. Many farmers in global north countries receive agricultural subsidies, which allow for relatively cheap and efficient food production and exports. This, in turn, hinders local food production in global south countries, as farmers cannot compete on an even level. This has implications for food shortages and the need for food imports. These imports are usually expensive and undermine the poor from accessing these food supplies. The increased scarcity of produce leads to price inflation, which brings about a number of social issues as it then becomes the urban poor who are unquestionably the most vulnerable because of restricted options for coping (Gregory et al, 2005). Access to produce and urban containment that serves to protect valuable agricultural land are two options that urban managers can control and consider for future development. Additional measures include the potential for urban agriculture and small-scale locally generated food gardens and markets.

#### *Fossil Fuel Depletion*

An oil based economy and climate change are interrelated as vehicle emissions contribute significantly to greenhouse gas emissions and inevitably global warming. Decreasing the demand for fossil fuels and the adoption of alternative sources of energy (such as solar, hydro and wind power) is thus not only necessary to decrease green-house gas emissions, but also are important to ensure that the urban poor are not further excluded from opportunity and services due to the rising unaffordability of transportation costs and utilities. The global use of oil as an energy source has promoted and contributed to the emergence of low-density and sprawling urban forms as well as dependency on private cars. Beyond this, the possibility of moving people and goods quickly and at cheaper costs over long distances exists. Cities that exhibit low density sprawl therefore contribute to green house gas emissions and resource depletion through the prioritization of private vehicular transport as the main mode of movement, and because people are required to travel large distances to reach places of employment. A key solution to reducing

green-house gas emissions is therefore to reduce the aggregate amount of movement which occurs within cities.

#### *Globalisation and Economic Restructuring*

Urbanisation has increasingly led to new ways of understanding the globalization of capital, labour and culture to a new mode of capitalist development that is flexible and information based and which is facilitated by the advancement of information and communication technologies (Soja & Kanai, 2007). One of the most significant effects of globalization and economic restructuring has been the change in urban labour markets. This has resulted in service sector growth and a decline in manufacturing which contributes to the increasing socio-economic polarisation prevalent in many cities across the globe (UN Habitat, 2009). Globalisation has also meant access to a global surplus labour force that is flexible, adaptable and cheap (Shatkin, 2007). This is an important outcome that sees restrictions being placed on the labour force to increase profitability. Furthermore, it involves short-term contractual labour, restrictions on the working age and gender, and the reduction in the power of trade unions, which serves to disempower the working class and increase precarious labour. The result of this, especially in the context of developing countries, is the emergence of informal economies which is said to be a "distinctive feature of both the urbanization of the world and the globalization of the urban" (Shatkin, 2007; UN Habitat, 2009; Soja & Kanai, 2007:65). The neoliberal agenda of globalization therefore relates to the decline in labour unions, reactions to state regulations and new industries which rely on less regulated labour markets (ibid.). This extends to informal housing which is related to the flow of labour, the demand for urban space and the inflexibility of private development and the formal housing market.

Globalisation and economic restructuring have affected both countries in the developed and developing countries in various ways, however the extent of this is also determined by local factors and governance (Shatkin, 2007; UN Habitat, 2009). This point is reiterated by Beall (2002) who states that macro-economic policies which accompany globalization, such as, neo-liberalisation and privatization can reduce the government's power to ensure social well-being and equality. Furthermore, views from major institutions such as the World Bank promote the idea that globalization empowers private sector interests, which reduces the role of government intervention. Soja and Kanai (2007) state that the increasing competition between global cities has been a pre-occupation with attracting investment and tourism, which diverts attention from the fulfillment of social services and the needs of disadvantaged communities.

Furthermore, the concept of "spatial targeting" concentrates investment in infrastructure and social services on leading urban centres results in imbalance and serves to worsen national

socio-economic polarization, as these investments are not adequately dispersed to include poorer towns and communities (Todes, 2013). These factors justify the need to create the structural pre-conditions conducive for small business activity.

#### *Pre-Conditions for small scale Income generation*

One of the most significant generic factors which affect the extent and distribution of opportunities for small-scale economic enterprises is the urban structure and form of cities. To this extent the imperative of urban management is to ensure: Diversity, Mixed Uses and Intergration. Diversity is essentially achieved through a local market which consists of high density, intensity and vibrancy. These conditions allow for high levels of social and public transport services which are convenient and inexpensive. Continuous linear systems should also be reinforced with high density housing and intensive activities to respond to the flows along them, resulting in 'activity spines'. This allows for a system where activities with

different spaces, rent-paying and accessibility requirements are able to find a place in the system. It further allows for all activities to benefit from the generative capacity of others and promotes equity in a sense that it has the potential to reach a greater number of people than exclusively nodal based forms of development.

The second structural pre-requisite for the creation of small-scale business activity are mixed uses, this crucial for urban management to promote as a mix of uses encourages greater integration of income groups. Separation and monofunctional land uses reduce levels of economic opportunity for small operators as well as locational synergy.

Lastly, in terms of intergration the greatest opportunity of small-scale agriculture lies in close to dense urban markets. This is advantageous as it decreases the scale of agricultural production and the unit cost of transport to market. The further away small farmers are from marketing points, the more they are forced to rely on the services of 'intermediaries'. Urban growth management should therefore implement a fixed edge between dense urban areas and agricultural land which is conducive to small-scale agriculture and serves other multi-functional uses, such as, storm water run-off and partially treated sewerage to be returned more easily to the agricultural land for productive use (Dewar et al, 1995).

In relation to the global challenges presented, it is imperative for planning and urban management processes to be driven by local sustainability efforts that encourage the use of local resources and are directed to the generation of local economic development, rather than reliance on global and external forces. This will ensure intergenerational sustainability and contribute towards the improvement of global equality.

## NORMATIVELY DERIVED PERFORMANCE QUALITIES

### BALANCE

There are two forms of balance. The first form relates to balance between society and the landscape and the three landscapes, (urban, rural and the wilderness/natural pristine areas) (pristine natural areas) being brought into harmony and interaction between them (Dewar, forthcoming; Dewar & Kiepiel, 2012). The second form of balance refers to the association between people and settlement opportunities. To this extent the concern relates to achieving balanced settlements in which everyone can obtain relatively convenient and equitable access to a full range of urban opportunities and activities, which are vital for an enriching and enabling life. From a structural perspective it involves maintaining contact with the natural context within which development occurs and essentially lies in allowing people to be part of the totality of the place in which they live, central to the concept of regionalism. The task of urban management is thus to ensure that a significant, proximate and permanent relationship is maintained between the urban, rural and primeval over time. This can be initiated through development parameters such as a "fixed edge". Balance also refers to structural configurations which generate greater opportunities for people and enhances living. The primary elements of urban structure (for example: institutions, public spaces and channels of movement) should accommodate, promote and boost activities which define urban life as well as ensure equitable access to urban opportunities and facilities for all urban inhabitants (Dewar & Uytendogaardt, 1995)

### EFFICIENCY

Efficiency with regards to settlement making refers to efficient land utilization and service provision and the functional and spatial relationships between them. It has the potential to minimize serviced land costs of critical importance as it calls for facilities, amenities and services to be planned in an

efficient and systematic manner. According to Behrens and Watson (1996) efficiency allows for the following principles: the clustering of public facilities according to their functional relationships which allows for the sharing of resources between facilities and reduces the costs and time because shorter trips are required to reach more services, facilities and employment opportunities. To this extent the allocation of resources can benefit entire communities as opposed to a limited number of households. Furthermore, it is concerned with the integration of public urban space with utility services, which in turn performs multi-functional uses.

This requires a compromise to be made between the conflicting requirements for mobility (rapid movement) and greater accessibility (reduced aggregate amounts of vehicular movement) and the dominance of NMT and public transportation over private vehicular movement (Dewar, forthcoming).

### EQUITY OF ACCESS

Positive urban environments allow for allow for optimal levels of access and convenience. It is concerned primarily with equity of access that ensures all people have relatively easy access to a full range of urban and natural opportunities (Dewar, forthcoming). Structurally, this involves the integration of the local road network with the surrounding movement system, an efficient and effective public transportation system and an urban structure, which prioritises pedestrian movement. These initiatives will essentially improve integration among different neighbourhoods and allow for multi-functional resource uses. Furthermore, it has socio-economic benefits in terms of reduced time (from long-haul distances) and costs of travel for low-income households. A further structuring element which results in a more equitable and accessible settlement form is through efficient public facilities and mixed land-use patterns (Behrens & Watson, 1996). This involves integrating different land uses and transportation modes, the strategic location of public facilities, the clustering of facilities and a more integrated transportation network.

### INTERGRATION

A settlement should also be carefully tied into the city-wide movement, water and green systems. This allows for a movement structure that is highly permeable and a considerable amount of activity mix both vertically and horizontally.

### CHOICE

The most positive environments are those, which offer a wide and diverse range of choices to people, it is thus essential that the choices available to end-user communities be maximised (Dewar,

forthcoming; Behrens & Watson, 1996). These choices relate to "housing consolidation, service provision, urban

surroundings and movement modes" as well as choice of life style (Behrens & Watson, 1996:86). Environments which are rich in choice do not dictate "either-or" choices but it implies that choices should be within an acceptable range of mix. Choice can therefore be created by providing "contrasting urban spaces of release and relaxation in intense urban environments and spaces of exchange and interaction in quieter areas" (Behrens & Watson, 1996:86). This is reiterated by Dewar (forthcoming: 11) who states that the central choice in settlement should be made from "very public and intense to very quiet and private". In addition, choice also refers to a wide range of housing forms (which vary in terms of location, density, size, shape, height and levels of privacy) and housing entry levels (Behrens & Watson, 1996; Dewar, forthcoming).

### PLACE-MAKING

Good urban environments involves the creation of a unique sense of place and a rejection of uniformity and standardisation. There are various structural factors, which constitute principles of place making. These range from the form of the settlement to the characteristics of the landscape, for example, the climate, landform and water flows. The second contributory factor to a sense of place is the quality and coherence of the public spatial environment. The third factor, which contributes to a sense of place, is the clarity and legibility of the public urban structure and the use of landmarks to promote orientation. Lastly, place-making is concerned with the creation of "special places", where everyone is treated with equal dignity (Dewar, forthcoming). The structuring element for achieving place making, is through the placement of public institutions and facilities around public spaces, which serve as a focal point in urban environments (Behrens & Watson, 1996).

These public spaces take different forms, for example, hard open spaces to accommodate public facilities, squares and public markets. Furthermore, streetscapes provide the focal points for social interaction, community events and street trading.

Soft open spaces take the form of parks and recreational walkways and are usually landscaped with trees in order to soften these spaces and add visual qualities which enhance the comfort of urban environments (Behrens & Watson, 1996).

#### SAFETY AND SECURITY

The essential concern is the creation of settlements which are safe and secure. This has broad implications and can refer to: security of tenure; food security; safety from hazards (fire and floods) and safety from vehicular accidents and safety from attack. However, with reference to the urban form of settlements the essential concern is surveillance (Dewar, forthcoming). Criminal activities and deviant behaviour can be controlled through settlement design adequate lighting and which essentially increases surveillance. This involves well lit NMT routes, such as, pedestrian routes particularly at night time. The width of a linear parkway is also important as it users of the space to see and easily identify any possible dangers. Housing typologies such as perimeter housing also allows for community surveillance as housing fronts onto the public courtyard in order to maximise surveillance. Soft open spaces, such as sports and playing fields, should also be clustered with schools and sports clubs, to encourage multi-functional use and activity as this ensures long hours of and increased surveillance and visibility. Lastly, plant and tree landscaping should avoid the creation of hidden places in order to reduce opportunities to commit crimes in the space.

#### URBAN SUSTAINABILITY

Urban sustainability refers to the efficient use of resources. This also includes the broader aspects of sustainability, such as, ecological, economic and social sustainability. At the most fundamental level it recognizes that settlements are similar to metabolisms in that they have inputs, throughputs and outputs (Gasson, 2000). Sustainability requires that in terms of inputs, maximum use is made of renewable resources and that both the impact on productive land, land of amenity and the ecological footprint be as small as possible. In terms of throughputs sustainability refers to the way in which energy flows are optimized. Outputs refers to the disposal of waste with minimum ecological and human impact and where feasible that they are recycled productively (Dewar, forthcoming). Essentially, this requires the use of natural resources so that ecological processes are not impeded upon and that natural environments can be sustained. In terms of the implications for urban form, settlements should be compact so that the ecological footprint is small enough to reduce aggregate amounts of movement and protect valuable land from urban development. landscape features (Gasson, 2007). Urban

sustainability is thus concerned with promoting the resilience of urban settlements.

#### THE NATURE OF THE PLAN

According to Dewar & Uytendogaardt (1991:23) spatial plans are a central tool of urban management and represent an attempt to "order" and "structure" urban growth. To this extent "structure" refers to the creation of the spatial geometry of settlements to which human activities respond. "Order" refers a spatial outcome that is established because of a physical response to the dynamics of urban growth and change.

The purpose of the plan is therefore to give an overall direction to urban growth while creating maximum maneuvering space for individuals operating in their own self interest in urban environments: which are responsive to human needs, environmentally pleasing and vibrant in terms of activity.

The making of positive, rich and complex urban environments requires exercising both freedom and constraint. If there is excessive control and restraint sterility occurs. Furthermore, individual needs and desires are inadequately satisfied. Over-controlled plans are thus seen as "impositionary" because they dictate a way of life on urban dwellers (Dewar & Uytendogaardt, 1991:23). Freedom of decision-making on the other hand, encourages true participation and exists in the context of choice, which is created through constraint. Constraint is thus an important element in the plan, as it controls the amount of freedom for individual self-interest, which may be detrimental and exploitative to the performance of the urban system as a whole (Dewar & Uytendogaardt, 1991).

There are two programmatic approaches, which emphasize the imbalance between freedom and constraint. The first is the "Laissez faire" approach, which promotes the idea that public expression of the plan is not a requirement and that capitalist market forces and private actions inevitably determine the outcome of development. This approach therefore emphasizes freedom as well as freedom of self-expression. This in turn has implications for poverty and inequality. The opposing approach is known as the "Rational Comprehensive" or "Blue-print" planning approach and emphasizes the degree to which plans should pre-determine urban decisions, and constrain freedom of action to a great degree. This approach is seen as a high-controlled process leading to "balanced end-states" as the focus is on the distribution of land uses with space demands being calculated "scientifically" around generalized thresholds ( for example, x number of schools can support y primary schools, and z secondary schools and a certain number of meters for commercial space) (Dewar & Todeschini, 2004:38). Under these programmatic

approaches, planning and design is seen as a rational distribution of land uses and facilities, with each facility being treated separately from the others. The legal instrument of land use zoning is the logical management tool which results form the process. This results in urban environments that are sterile and monotonous, failing to create complexity and diversity (Dewar & Uytendogaardt, 1991). It is clear that the inevitable consequences of programmatic approaches is sterility as nothing holds the whole together. Furthermore, if any significant improvements are to be made, a paradigm shift is required. Firstly, this would involve adopting an "urban" as opposed to "suburban model" of development and secondly, it would involve replacing programmatic approaches to settlement making, with non-programmatic ones.

The dissertation therefore calls for a "Non-programmatic" approach to plan making which focuses on "optimising the quality of the whole rather than maximising the operation of the parts" (Dewar & Todeschini, 2004:40). To this extent, it is recognized that for the whole to work well there must be integration between separate parts "driven by a search for the lasting qualities reflected in living environments, that work well for all inhabitants" (Dewar & Todeschini, 2004:40). The Non-programmatic approach to settlement serves to accomodate growth and change based on an understanding of universal need.

Essentially, Non-programmatic approaches differ from programmatic approaches by striving to achieve the following objectives (Dewar & Todeschini, 2004:41):

-The approach does not attempt to define the "good urban life" but instead concentrates on the creation of choice.

-The focus of Non-programmatic approaches is on promoting the public good rather than the self-interests of a limited number of individuals or groups.

-It seeks to meet identified urban performance qualities as opposed to idealised spatial forms.

-The approach does not attempt to influence spatial distribution directly in an autocratic and top-down manner as it manipulates the logic of access to which activities respond in order to generate predictable outcomes.

-Non-programmatic approaches focus on the distribution and accommodation of human activities in space rather than mono-functional land uses.

## THE LEGISLATIVE FRAMEWORK

This section aims to outline the various legislative and regulatory informants, which will need to be taken into consideration for the development proposals to be put forward for Wingfield.

### CONSTITUTIONAL LAW

The Constitution of the Republic of South Africa Act (No. 108 of 1996) is the supreme law of the Republic and any law or conduct, which conflicts with the Constitution, is invalid. From a planning perspective all planning laws must be drafted by the sphere of government that has the Constitutionally conferred power to do so, and each sphere of government must ensure that when dealing with planning matters, they give effect to the fundamental rights enshrined in the Bill of Rights section of the Constitution.

The primary objectives of the Constitution are to ensure the human rights and dignity of all people whilst simultaneously advancing human equality.

### *Spatial Planning and Land Use Management Act (SPLUMA)*

On the 5 August 2013, SPLUMA (No. 16 of 2013) was promulgated to replace the Development Facilitation Act (67 of 1995) as the national planning and land-use management act. SPLUMA is a national act that applies to the entire area of the Republic of South Africa. It regulates all three spheres of government, namely, national, provincial and municipal planning, in providing uniform, effective and comprehensive systems of spatial planning and land-use management.

The objectives of SPLUMA are therefore to:

Ensure the system of spatial planning and land use management promotes social and economic inclusion;

-Provide for development principles and norms

-Sustainable and efficient use of land

-Co-operative government and intergovernmental relations

-Redress the imbalances of the past to ensure equity in application of spatial development planning and land use management systems.

### *LAND-USE PLANNING ACT (LUPA)*

The Land-use Planning Act (3 of 2014) was promulgated on 7 April 2014, and although it is not fully in effect, will repeal the Western Cape Land Use Planning Ordinance no 15 of 1985. The Act seeks to clarify the functions of municipalities and provincial government in respect of land use planning, which include:

-Structure Plans

-Zoning Schemes

-Subdivision of land

-Planning Advisory

-General Provisions

### *Municipal Systems Act (MSA)*

The Municipal Systems Act (32 of 2000) was introduced on 20 of November 2000 and contributes towards the realization of rights contained in the Constitution. It must be read with Chapter 1 of the Development Facilitation Act (Act 67 of 1995), which describes the principles that must govern the development of land. To this extent development means sustainable development and includes: intergrated social; economic; enviromental; spatial and infrastructural upliftment of a community with special reference to the poor and other disadvantaged sectors of the community in ensuring that development serves present and future generations. The MSA requires all municipalities to produce an Integrated Development Plan (IDP) for their area of jurisdiction every 5 years. A central purpose of the Act is to achieve a more integrated spatial planning system.

### *Integrated Development Plan (IDP)*

An IDP is a vision for the long-term development of the municipality with a special emphasis on the municipality's crucial development and internal transformation needs. The plan involves a review of the existing level of development in the municipality, which must include: an identification of communities, which do not have access to basic municipal services; an SDF which must consist of the basic guidelines for a land use management system for the municipality; applicable disaster management plans and a financial plan which includes a

budget projection for at least the next three years. The IDP effectively forms the policy framework and general basis on which the annual budget must be based and provides a framework for co-ordination.

### *Spatial Development Framework (SDFs)*

Each municipality is required to compile a spatial development framework for the area. The SDF builds on the IDP, and must correspond to the spatial aspect of the IDP (ibid.). An SDF is a future spatial plan for the province or municipality which maps out the desired vision and growth trajectory and considers the main public structure (green space, movement of all modes, public institutions, urban space, utility services and emergency services) in relationship to one another as well as in relation to the emerging capital infrastructure (Dewar, Louw & Povall, 2012). The municipal SDF must be reviewed every 5 years.

### *NATIONAL ENVIROMENTAL ACT (NEMA)*

The National Environmental and Management Act (107 of 1998) is the overarching environmental legislation in South Africa and is complemented by sectorally specific Acts, for example: The Biodiversity Act; the Protected Areas Act and the Integrated Coastal Management Act, amongst others.

The Act includes core principles of:

-Sustainable Development

-Integrated environmental management

-Environmental Justice ('the polluter pays')

-Equitable access to environmental resources

-Community empowerment

## CHAPTER 5

### WINGFIELD

#### Location Description

At the metropolitan scale, the Wingfield site is well located within the CTMA. From a structural perspective, Wingfield it is located between two major economic corridors, namely, the Voortrekker Road and Koeberg Road corridors and is a significant inner-city site as it reinforces both the CBD and Century City. The site is therefore close to many economic opportunities and surrounding industrial areas. The Wingfield site is bounded the N1 highway in the North and the N7 to the East. The Voortrekker Road Corridor, runs parallel to the southern boundary of the site, and the railway line. The Wingfield site does not fall within flood risk zones, coastal zones, high potential agricultural areas or protected heritage resource areas. However, a portion of the site situated in the north-west of the study area is listed as a critical biodiversity area so development on this portion would be limited to low impact activities, such as conservation activities and public open space. Figure 15 (opposite) shows the location of the Wingfield site within the metropolitan context.

#### Existing Uses

On a more local context the study area covers approximately 650 ha of land in conjunction with the 3km radius of urban development which surrounds it. The existing land uses and public facilities within the study area are situated in Acacia Park, which makes up the northern section of the Wingfield Aerodome site. In terms of residential land use- the Acacia Park functions as one of three parliamentary villages in Cape Town. The Eastern and southern portions of Acacia Park both include industrial land uses. The public facilities include a primary school (which has sports and recreational facilities). Acacia Park is the largest portion of the study area. Voortrekker Road, the major activity route, abutting the site in the southern portion offers vibrant retail and mixed-use activity, social and commercial services and good public transport links. It includes continuous development which consists of linear commercial and business developments, light industry, institutions and social facilities. Furthermore, It is supported by medium to higher density development with interrupted movement flows occurring at public transport stops and intersections. Sections of the corridor are also pedestrian oriented. The two major neighbouring residential areas surrounding the study area include Kensington to the west and Goodwood to the east. These areas are considered to be low-medium income areas with fairly low-density development. Century City and N1 city are the two main commercial nodes that are in close proximity to the site. Lastly, the Goodwood cemetery forms the southern boundary of the site.

At present the site is a state-owned, underutilized military land with the current right to the site being for military use. Wingfield is also significant as it is an inner city site, corridor reinforcing site located in a major economic backbone within the CTMA, with little urban development on the site that will result in a loss of existing infrastructure. These factors justify the strategic potential of the site to be used for intensified mixed-use development in order to create and reinforce opportunities in the area. The Wingfield site should also accommodate land claimants who were forcibly removed from the area during the 1930s, this is considered significant in terms of the rationale for the project in achieving social justice.

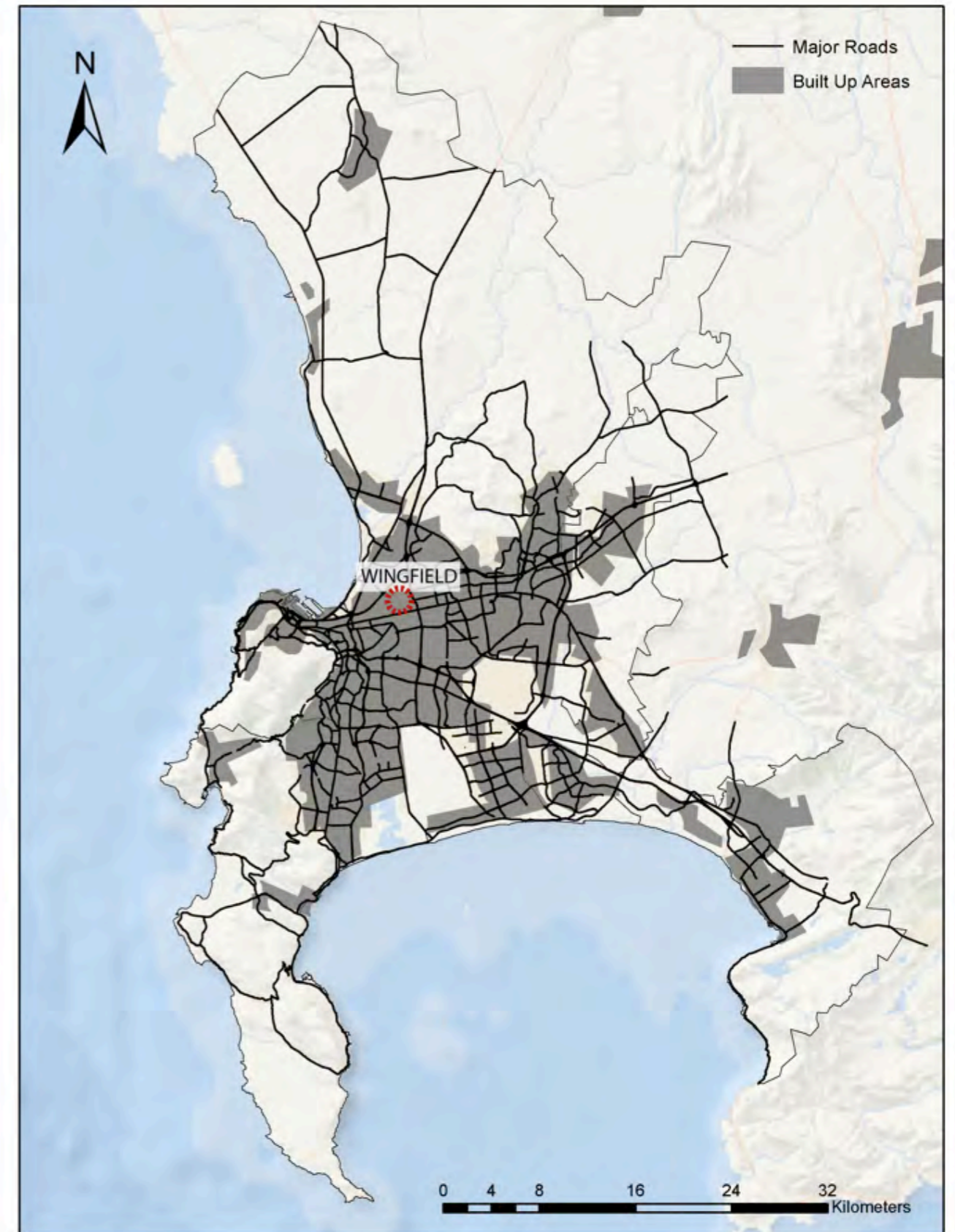


Figure 16: The location of Wingfield within the Cape Town Metropolitan Area  
(Source: Author; GIS Technical Library, University of Cape Town)

## Historical Overview

The Wingfield site was formerly utilized as an airfield during the Second World War. The land originally belonged to the *Graaff Family Trust*, who then sold the land to the South African Government (under Smuts) on condition that the government sell the land back to the trust once it was no longer required for defence purposes (de Lange, 1998). Although Wingfield is now effectively "state-owned" land, this has proved to be an on-going obstacle for the redevelopment of the site as in the event that negotiations should occur with the department of defence for the land to be reverted to the Graaff Trust, it would imply that the original purchase price inclusive of interest would be paid to the state. This means that the state will then be compensated for buildings it does not want to remove (de Lange, 1998). A further issue in terms of the redevelopment of the Wingfield site is a successful land restitution claim, which involved the *Ndabeni Community Trust*, being awarded 55ha of the 100 hectare Wingfield site in 2001 (Brown-Luthango, 2007). The Ndabeni group had been forcefully relocated to Langa during by the apartheid administration. Although the land restitution claim was granted in 2001, the claimants have to date been unable to settle on the land awarded to them. The land has since been used for industrial activity with the land claimants now opting for the land at the Wingfield base.



Figure 17: The Wingfield site during the 1950s  
(Source: <https://c1.staticflickr.com>)

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## CHAPTER 6

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### The way forward: The Required Urban Planning Response

This section begins with identifying the need for structural intensification as an urban growth management and restructuring tool by outlining the key aspects of the concept city debate and its significance in: Reinforcing existing opportunities; Transit-Orientated Development (TOD) and Activity Corridors. This will be followed by an analysis of the Wingfield site across all three of the above aspects, followed by the last section which deals with a contextual analysis and concept for the site at the metropolitan level.

The challenge facing urban decision makers is therefore to restructure settlements at a variety of scales in order to make them more efficient, equitable and sustainable (Dewar, Louw & Povall, 2012). This requires densification, intensification and diversification around strategically significant lines and points, for example, intensification around clusters of existing opportunities, reinforcing corridors which multiple modes of transportation and reinforcing public transit stops. Furthermore it requires the diversification of small and micro-enterprise economies.

Given the existing urban problems in South African towns and cities at present, there is dire need for urban decision makers to implement greater compaction, higher densities and greater integration through the management of urban growth.

#### The Need for Structural Intensification

The 'Compact City' approach emerged in response to the urban sprawl and low-density suburbs as a result of the dependency on the automobile. Newman & Kenworthy (1996:6) state that it was not on the automobile itself that was an issue; rather it was because of the "overuse and dependency on the automobile" that led to an interest in a compact city approach. Furthermore, it was driven by the search for global sustainability goals on climate change and resource use and was initially exclusively focused on the developed world: it did not take into the consideration the implication of urban development in the developing world context (Jenks & Burgess, 2000).

The difference in socio-economic conditions of the urban populations of developing countries has meant that compact city approaches have increasingly focused on the developmental side of the sustainability agenda. For this reason most compact city approaches have accepted the concept of socio-economic sustainability based on the acceptance of the unavoidable need for economic growth and the merits of the principles of 'intra-generational equity' and 'social justice' (Haughton and Hunter, 1994, cited in Jenks & Burgess, 2000). Since then the compact city concept has increasingly become more aligned with the developing world context. In this regard, the Compact City model is highly relevant to the South African context, because of the efficiencies associated with transport, environmental degradation and the socio-economic inequalities, which characterize South African cities. This section will thus analyze the characteristics of the compact city model as a sustainable urban form towards promoting a more environmentally sustainable and equitable society in South African cities.

The concept of compact cities has seen various definitions, but in general it calls for a relatively high-density, mixed-use city that is based on an efficient public transportation system and includes dimensions that encourage walking and cycling such as NMT (Burton, 2000). The process involves mechanisms such as intensification which uses urban land more efficiently by increasing the density of development and activity and densification through re-use and infill development, more intensive use of existing urban buildings and an increase in the density of the population in urban areas (Burton, 2000; Jabareen, 2010). The compact city model is advantageous as it consists of both environmental and socio-economic benefits, these include, conservation of valuable agricultural and rural land; reduced car dependency and fuel emissions; support for public transportation, walking and cycling; better access to public services and social facilities; and more efficient utility and infrastructure provision and regeneration of inner urban areas (Burton, 2000). The model is therefore seen to contribute to the objective of sustainable development by embracing the social and economic dimensions of sustainability as well as environmental concerns. However, the model is not without criticism and counter arguments, most of which has occurred because of the lack of empirical evidence to support claims or counterclaims (Burton, 2000). The following section will analyze the benefits and costs of the approach in relation to the case of South Africa.

The next section will outline the benefits and disadvantages of the concept city approach for South African cities.

## Environmental Benefits

### *Protection of Valuable Agricultural Land*

Gasson (2007:3) asserts that the current rate of land conversion of agricultural and rural lands is accelerating due to 'contemporary city forms which take the form of dispersed and sprawling footprints'. Gasson (2007) states further that in order to reduce the rate of land consumption and to protect resources, more compact urban forms at higher densities are required. These urban controls are especially important in securing future food security and sufficient clean air and water supplies for current and future generations (Gasson, 2007). In this case, Dewar and Uytendogaardt (1991) proposed the idea of 'urban-rural' edges. This refers to the close and permanent relationship between urban and natural areas which generates a number of advantages beyond just access to nature. In the context of South Africa, which is characterized by high degrees of poverty and unemployment, this situation makes small-scale agriculture viable. A denser urban form and the preservation of urban agricultural land also reduces the significance of transportation costs by ensuring cheaper access through shorter trips for farmers in accessing their markets. This in turn stimulates the local economy and secures the livelihoods of many citizens.

### *Decreased Emissions*

According to Dodman (2009:2) low-density car oriented suburbs will become unsustainable long before fossil fuels run out. This is with reference to excessive automobile travel which has received increasing world wide attention due to its contribution to greenhouse gases (Newman & Kenworthy, 1996). Furthermore, it has been asserted by Newman and Kenworthy (1989) who suggest that gasoline use per capita declines with urban density. Dodman (2009) argues that in compact cities such as Barcelona and London greenhouse gas emissions were relatively low in terms of per capita emissions and in comparison to the Spanish and English averages. In the case of Barcelona, this is due partially to the compact urban structure with many people living in high-density apartments as opposed to individual houses. In the case of London this refers to the halving of industrial emissions. Dense urban settlements can therefore be seen to enable lifestyles that reduce per capita greenhouse gas emissions through the concentration of services that reduces the need to travel large distances

(Dodman, 2009). It is therefore essential that urban managers implement higher urban densities and land-use intensification as this increases the viability of public transportation and NMT usage. These modes are said to decrease in per-household vehicle of 20-40 % whilst simultaneously reducing emissions. High density areas can lead to 'economies' of scale, proximity and agglomeration that can have a positive impact on the use of NMT. This therefore provides evidence of the benefit of the compact city model in not only increasing the feasibility of public transportation and NMT but also reducing emissions and contributing to environmental sustainability.

#### *Increased Resilience to Climate Change*

The current sprawling urban forms contributed disproportionately to climate change as green house gas emissions and loss of valuable natural resources cause rising average annual temperatures and increase the occurrence of catastrophic events. Thus compact urban form and intensification of land uses must be implemented in order to protect and preserve natural assets, such as, arable land and ecological biodiversity, which protect the urban poor from catastrophic events such as floods, fires and famine (Dodman, 2009; Mirza, 2003). Extreme weather events have generated enormous pressures on poor economies, infrastructure incapacity which increasingly make the poor vulnerable (Mirza, 2003). In addition, poorer groups are disproportionately vulnerable for a variety of reasons, including: a greater exposure to hazards as a result of living on environmentally unsafe sites; a lack of hazard-reducing infrastructure such as drainage systems; the ability to move to better quality of housing; and a lack of government funds to provide assistance in the event of disaster (Dodman, 2009). According to Gaston (2010) green spaces provide a wide range of locally generated ecosystem services in urban areas as well as providing an important habitat for many animal and plant species. This suggests that the potential exists for the maximization of ecological services through careful consideration of the structure of the landscape, which will allow for the full benefit of ecosystem services and will serve to further protect cities from the effects of global climate changes.

#### *Densification and Social Equity*

South African cities are characterised by levels of poverty, unemployment, inequality and informality. In this regard the compact city approach would be beneficial in achieving greater social equity. According to Burton (2000:1971), equal opportunities are defined in terms of possession of certain social or "primary" goods. Burton (2000) adds that higher densities are associated with benefits or

life chances for the disadvantaged, thereby reducing the gap between the advantaged and disadvantaged. The compact city approach has increasingly focused on the socio-economic aspects of sustainability for developing countries (Burgess, 2000). This section will discuss the elements of social equity in relation to the Compact City model as well as, identifying the disadvantages which could be caused by denser urban forms in the South African context.

#### *Increased Access to Social and Commercial Facilities*

Levels of social and commercial services are higher, more convenient and provide greater equity of access in a compact city form. To this extent, it provides a greater range of services that can be easily experienced and supported because of higher thresholds. It has also been argued that in a compact city, households are in closer proximity to facilities and that higher population thresholds will support the economic viability of a diversification of facilities (Burton, 2000). A compact city form potentially provides a tool for breaking down the current skewed urban form of the coarse-grain and fragmented urban fabric inherent in South African cities. To this extent densification is advantageous to low-income households who do not have access to a private car, as close proximity allows for shorter trips and thus reduced public transportation costs (Dewar and Uytendogaardt, 1991).

#### *Better access to employment opportunities*

The compact city approach is particularly advantageous for people living in South African cities who often spend in excess their average annual income, commuting between places of residence in peripheral locations, to places of work which are often located in up-market suburban areas (Turok & Watson, 2001). However, critics have questioned the advantage of compact city policies in contexts in which suitable jobs are scarce (Burton, 2000). A counter argument is made by Dewar & Uytendogaardt (1991) who state that the more compact the local market, the greater the range of potential economic opportunities, which present themselves to all inhabitants. Furthermore, they add that this is important in the case of small-scale economic enterprises as there are opportunities for greater economic diversification and specialization. Compaction also allows for more efficient functioning of an informal sector, which, in the South African context, constitutes a large portion of livelihoods with a great number of household needs being met on a commercial basis especially for poor communities (Dewar and Uytendogaardt, 1991).

#### *Viable public transport and NMT*

It is widely accepted that higher densities increase the viability of NMT and public transportation, compared to the sprawling urban

model. When public transport is efficient, there is a tendency for people to live in close proximity to transit stops (Newman, 1992). Empirical studies have shown that higher densities are associated with a high public transportation usage (Burton, 2000; Jabareen, 2006). Holding constant the mix of land uses and increased land use intensification, residents of higher density areas were more likely to commute by transit, walking and cycling and thus less likely to drive cars, than people who live in lower-density areas (Jabareen, 2006). The compact city is also perceived to be a pedestrian-friendly city or a 'walking city', which is a more equitable alternative to car-led urban sprawl (Burton, 2000). South African cities can therefore benefit from this, as the majority of households do not have access to a private motor vehicle and have to utilize public transport and NMT.

## DISADVANTAGES OF DENSIFICATION FOR THE URBAN POOR

#### *Reduced Living Space*

Burton (2000) argues that the compact city model may affect social equity through the living space available to the urban poor. This is because higher-density housing is often associated with reduced dwelling sizes and little, if any, garden space. Burton (2000) argues further that if densities are to be increased, it is inevitably the poor who will lose out. However, in the South African context this issue can be debated as the advantages of smaller living spaces is outweighed by the social and economic benefits of densification and increased proximity to public facilities and services. Furthermore, urban agriculture should accompany urban compaction and high-density housing should be associated with adequate public spaces.

#### *Lack of Affordable Housing for the poor*

A further critique of the compact city approach is that higher densities and compact city policies and management tools, such as an urban edge, will lead to affordability problems (Burton, 2000). The counter arguments which are made is that higher densities will in fact lead to a lack of affordable housing for the poor because less developable land, increase housing scarcities and consequently a higher demand for housing will result in housing values being inflated by extra costs. In the South African context the government aims to deal with this situation by providing the poor with subsidies and affordable housing. However, the situation is far from ideal as government incapacity, partially because of a lack

of monetary resources, impedes well-located developments, which consequently leads to development of land on the urban periphery.

#### *Lack of Access to Green Spaces*

It has also been argued by critics of the compact city concept that higher urban densities imply that residents are more likely to live further away from accessible green spaces. They argue that recreational amenities such as parks and open spaces are plentiful in low-density cities, with low-income households having to walk little distances to reach such space (Burton, 2000). However, it is counter-argued that while, dense urban settlements may be located further away from green urban spaces, an advantage of the compact city concept is that they may actually be relatively easier to access the surrounding country side. In the South African context, a lack of resources to maintain recreational green spaces coupled with the fact that these spaces are commonly unsafe and are dumping grounds, reinforces the compact city concept which allows greater accessibility to the country side.

#### *Safety and Security*

According to Burton (2000), urban compactness is considered to have the potential to reduce crime compared to low density housing on the periphery, which may be neglected because of a lack of access to social facilities, and isolation from employment opportunities. It is argued that there may be a relationship between higher compact in settlements and the likelihood of being a victim of crime, because of the increasing population thresholds. However, it has also been argued that higher densities promote increased surveillance, which should decrease the occurrence of criminal activity. Jacobs (1961:35) argues that presence of "eyes on the street" increases the safety of both residents and strangers. In such circumstances it is important that housing and other land uses front onto space to maximise surveillance as oppose to backing onto it (Behrens & Watson,1996). Burton (2000) argues that the relationship between settlement form and crime is actually based more on the location, building form and income levels of residents than it is on the net densities and compactness of the settlement.

## STRUCTURAL INTENSIFICATION

The previous section addressed the need for densification of South African cities by analysing the advantages and disadvantages of the Compact City debate in relation to the South African context. This section highlights two strategies to achieve compaction in low density contexts and examines two common urban restructuring mechanisms, namely, TOD and Activity Corridors to achieve greater structural intensification to improve the urban poor's access to socio-economic opportunities and thus to promote social justice. It is important to note that TOD and corridor development are not mutually exclusive concepts: rather, they be implemented in an integrated manner to achieve densification and intensification. Wilkinson (2006) states that TOD has achieved widespread acknowledgement as a way to achieve "compact city" development patterns through the development of high density, mixed use public transport corridors as a way to enhance the effectiveness of the urban transportation system.

### Transit Orientated Development

TOD refers to development that is physically located to a public transport station. Through the concentration of pedestrian-oriented development around public transport terminals, it is argued that residents and workers are more likely to catch a train or bus as well as increasingly to make use of NMT modes such as walking and cycling. It is further argued that TODs should operate as public spaces for farmers markets, public celebrations and other activities (UN Habitat,2013). This essentially reduces the need for private vehicular transport usage and increases walkability and public transportation usage.

#### *Features of TOD*

Wilkinson (2006:224) elaborates on the unique and distinct features of TOD, which includes:

- At the neighbourhood level, TOD is centered on a rail or bus transit station and extends to a walking distance radius of 400m-800m;
- The urban fabric is developed at higher densities, but remains human scaled and includes significant provision of public and civic spaces, mixed-use residential, commercial and retail activities noticeably in the immediate station precinct;
- At a city scale,TOD involves the clustering of economic, social and environmental activities around major transport interchange points. This allows for convenient access to these services and a large variety and choice of activities within close proximity.

- A road layout, which is based on a "topologically open grid system" and which provides for extensive pedestrian and cycling movement, which are combined with traffic calming measures, presents a pedestrian friendly environment whilst enhancing the concept of 'walkability'.

#### *Advantages of TOD*

Firstly,TOD also has co-beneficial impacts, which including: per capita vehicle usage, which consequently reduces road congestion levels and travel times; and positive environmental impacts, such as a decrease in the use of fossil fuels and greenhouse gas emissions (Wilkinson, 2006).

Secondly, TOD makes public transportation more viable because of increased population thresholds which result from higher densities, and the close proximities of transit and land-use allocation that serve to promote accessibility (Newman & Kenworthy, 1996). Similarly, Wilkinson (2006:225) states that TOD improves the mobility of residents without access to private vehicles, who, under conventional suburban considerations, are "transport disadvantaged".

Thirdly, it is argued that TODs create more liveable environments, because of a layout that is scaled to the human and promotes NMT usage,which in turn promotes healthier lifestyles (Wilkinson, 2006).

Fourthly, sensible management can enable a city to use market forces to build up densities near stations where most services are located. This in turn creates efficient sub-centers through the promotion of activity corridors which ultimately promotes urban densification and minimizes sprawl.

TODs serve both symbolic and functional purposes. In a functional sense, the nodes which results are gathering places for public events, farmers markets and civic celebrations are "meeting places". They also provide functional benefits which not only increase public transportation usership, but also provide mobility choices, environmental benefits such as reducing air pollution and energy consumption rates as well as commercial and economic benefits through local market and retail activities which is supported by higher population thresholds (UN Habitat,2013). This is reinforced by Newman & Kenworthy (1996:7) who state that TOD offers 'high-profile' solutions to environmental and social problems of car dependent cities.

## TOD in the South African Context

Wilkinson (2006) states that TOD planning has largely been developed in terms of 'smart growth' in the North American context. Minimal overt attention has been given to the application of TOD in the third world context where TOD can be used for urban restructuring in order to achieve greater social equity (Wilkinson, 2006).

## Activity Corridor Development

According to Warnich and Verster (2005:344) the development of corridors present a powerful and effective strategy for the purpose of restructuring the spatial inequity of the city as well as for the promotion of economic growth points in close proximity to low-income communities. Thus corridors are said to function as tools for restructuring the fragmented urban patterns in South African cities, and to allow for more intensive and integrated urban environments

### The Nature of the Corridor

It is said that the function of an activity corridor differs according to scale. Activity corridors provide a structure which broad bands of high density mixed use linear development can respond to. Furthermore the corridor supports urban development which promotes economic opportunities and human interaction along its spine by ensuring the existence of the necessary thresholds to support these operations. Corridors operate along a major transportation route, including public transport modes and provides linkages between nodes and sub-nodes. Furthermore, it includes the availability of public services, intensification of development as well as public investment. These elements allow for the optimal functionality of the corridor and, more essentially, makes it a viable urban management tool that promotes a more integrated city form that serves to reduce sprawl (Warnich and Verster, 2005).

Movement lines are said to energy flows (flows of people, finance and goods and become the most ideal connection for activities which require the greatest public exposure (Dewar & Todeschini, 2004). Urban activities which require the greatest degree of public support will naturally gravitate towards the most accessible lines and points along these routes. This is beneficial, as it results in a situation where larger activities (which attract a large number of people) can work simultaneously with smaller activities who can in turn benefit from the glows generated by larger activities and contribute to an agglomeration of uses. The potential to attract a large number of people is related to high density

development (and therefore levels of support) which is a crucial pre-condition for environments that support public transportation, and high concentrations of residential, economic opportunities and social services in walking distance of public transportation services. In essence it is a characteristic of sustainable urban environments. Furthermore, higher densities support convenient pedestrian environments which are especially important in resource constrained countries (Dewar & Todeschini, 2004).

As a starting point it should be noted that corridors are not a short-term solution: the process of corridor formation is a long term, inevitable one. They emerge over-time and result from intensive activities being able to respond to movement flows. The promotion of urban corridors is thus an approach rather than a tool. To this end there are two issues central to planning and design. The first is that the concept of corridors is about beginnings as opposed to end-states. This points to the fact that they develop as a series of points along the line, which grow towards each other over time. The second issue is that corridors cannot be artificially imposed the pre-conditions for their successful evolution must be in place (Dewar & Todeschini, 2004).

Corridor development should also allow a mutually generative relationship between movement-intensive flows and human activities (Dewar & Uytienboogaardt, 1991). This has the potential to generate capacities which are characteristic of urban agglomeration, which allows different sized enterprises and activities with different generative capacities to find viable locations along the length of the corridor. This has the potential to maximize economic efficiency which cannot occur in primarily nodal developments. The system also promotes equity, in that it has the potential to reach a greater number of people than exclusively node-based forms of development which means people come to activities whereas, in the case of corridor development, activities are taken to people (ibid.) (Dewar & Uytienboogaardt, 1991). The success of the corridor lies on its ability to generate the required densities to promote the population thresholds (Dewar & Todeschini, 2004).

The success of an activity corridor lies in its ability to promote accessibility through decentralized activity patterns and the frequency of its 'stop-start' nature and congestion. Another requirement for ensuring the success of corridor development is highlighted by Jacobs (1961) who states that a pre-condition for great streets is sufficient density to support a vibrant street life and a variety of retail and business activities of all scales. Lastly, corridors should properly operate on both sides of the organizing route and as such be both legible and pedestrian friendly as pedestrians should be able to cross them frequently and easily (Dewar & Todeschini, 2004).

In considering corridors in an urban context, it is necessary to distinguish between two types of movement infrastructure.

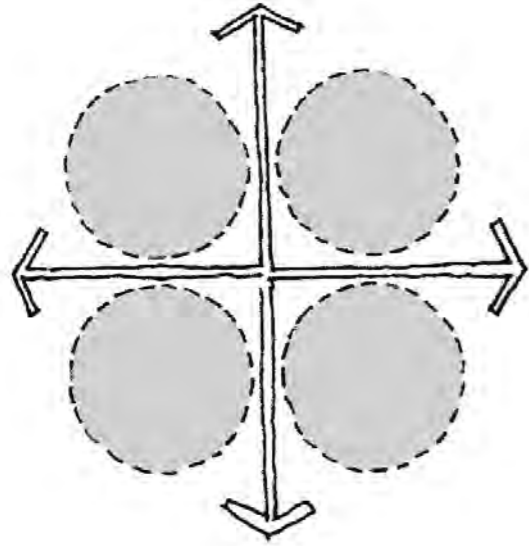
## Space Integrators and Space Bridgers

'Space Bridgers' are limited access channels, such as, freeways and railway lines which emphasize a limited number of access and egress points as opposed to lines of accessibility. Along the lengths between access and egress points, Space Bridgers operate as barriers, cutting off activities on one side of the route from the other. Their purpose is essentially to promote mobility, which is especially significant in terms of freight movement. They are essentially designed to move large numbers of people rapidly over long distances. Since space-bridgers establish point-related access of a few points of high accessibility nodes of access and egress, they often attract larger economic activities (Dewar & Todeschini, 2004). From a structural point of view, they have three characteristics. Firstly, as stated they create physical barriers across the urban fabric, to this extent what happens on one side of the route has no impact on what happens on the other; secondly, they create physical barriers as they allow for limited pedestrian crossing and thirdly they add to the fragmented nature of South African cities. The higher accessibility is also entirely car-related and therefore exclusionary to many. Therefore in practice, these routes reinforce a very limited number of points and do not promote widespread economic decentralization as they Space-bridgers promote sprawl and lead to the increasing dislocation between movement and urban activities (Dewar & Todeschini, 2004)

Dewar & Todeschini (2004) argue for an emphasis on 'Space Integrators', which are more continuous routes that allow for stop-start movement along their length. They promote integration between efficient public transportation and intensive mixed-use activities and exchange through the creation of opportunities for both large and small enterprises. In this case, all lines of circulation, whether primarily vehicular or pedestrian, formal or informal, have the capacity to attract activity. The argument for Space Integrators is that they help to order urban development and structure urban activities in a reinforcing way.

## Advantages of Corridors in South African Cities

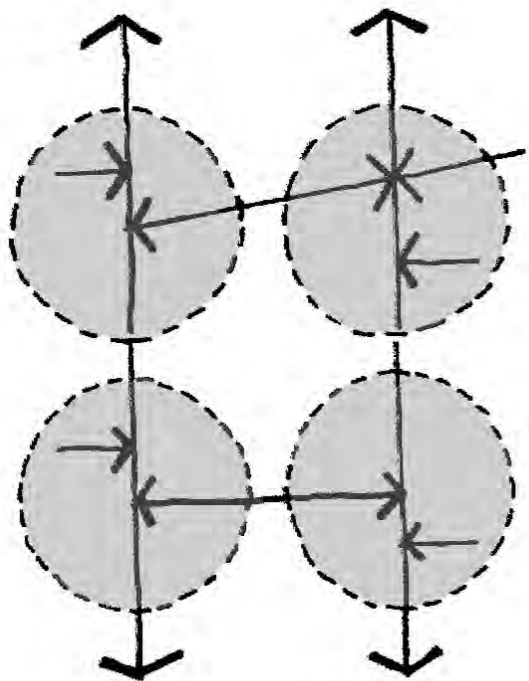
Activity corridors hold the power for restructuring the skewed urban form inherent in South Africa cities. Firstly, as the activities densify along these activity corridors, they have the potential to function as integrators and break down the introverted neighbourhood cells which are created by 'space bridgers'. This concept is illustrated in the figure 17 below



Secondly, corridors allow for the maximum generative capacity, which is inherent in urban agglomeration. Linear systems enable larger enterprises, which are the primary generators of movement the most accessible locations. However, smaller activities, which do not have a great generative capacity on can then feed off the flows which are generated by larger activities. This makes corridors well-suited to viable functioning of micro-enterprises (Dewar,2011).

Because of the range of conditions within the corridor, it discourages the tendency for spatial monopolisation by very large activities and thus discourages land speculation which contributes to economic equity and efficiency (Dewar,2011). This will result in employment and poverty alleviation in South African cities.

Lastly, corridors can help to promote social equity within South African cities as they have the potential to reach a large number of people, especially the poor who are located on the urban periphery. Corridors can act as metropolitan integrators due to more intensive activities, which breaks down the cellular pattern of development and ties local areas together.



## The Role of the Site

The metropolitan concept for Wingfield uses all the above concepts. Firstly, the site is strategically located as it takes people to public facilities and services based on the fact that it is an reinforcing inner-city site which is concentrated around existing economic nodes and opportunities, for example, the central city or CBD and Century City. Secondly, it takes services to people through decentralization, TOD (as it has rail and BRT stops) and is a corridor reinforcing site as it reinforces two activity corridors, to the south and west of the site. are not mutually exclusive. In summary at the metropolitan scale, the Wingfield site:

- It takes people to services as it is an inner city site that reinforces existing opportunities.

- Reinforces two corridors (for example, the Voortrekker Road and Koeberg Road activity spines) therefore taking services to people.

- It also takes people to services as the site promotes decentralization and holds the potential for vibrant activity, for example, business and socio-economic activities and opportunities

- The site has Rail and BRT stops which provide the opportunity for TOD which once again provides a mechanism to take services to people

In this way the Wingfield site responds to the need for structural intensification.

Figure 18: From Space Bridgers to Space Intergrators (Source: Adapted by Author from Dewar & Louw,2013)

## METROPOLITAN ANALYSIS

This section consists of an analysis of the study area and its broader context. To this extent it is based on understanding the structural dimensions and significance of the site and its potential for major densification, intensification and integration initiatives, which are required to achieve a more efficient and integrated metropolitan region.

It begins with a metropolitan analysis of the CTMA, to identify the contextual opportunities and constraints at a larger scale. The analysis begins with an assessment of Cape Town's biodiversity network or green systems, the movement systems and the higher order institutions, which provide an understanding of some of the structural elements that contribute towards Cape Town's skewed urban form. The focus at the metropolitan scale is on integrating the Wingfield site (an inner city and corridor reinforcing site) with the larger urban systems. A metropolitan concept is then put for metropolitan restructuring which attempt to address the urban challenges presented in previous chapters.

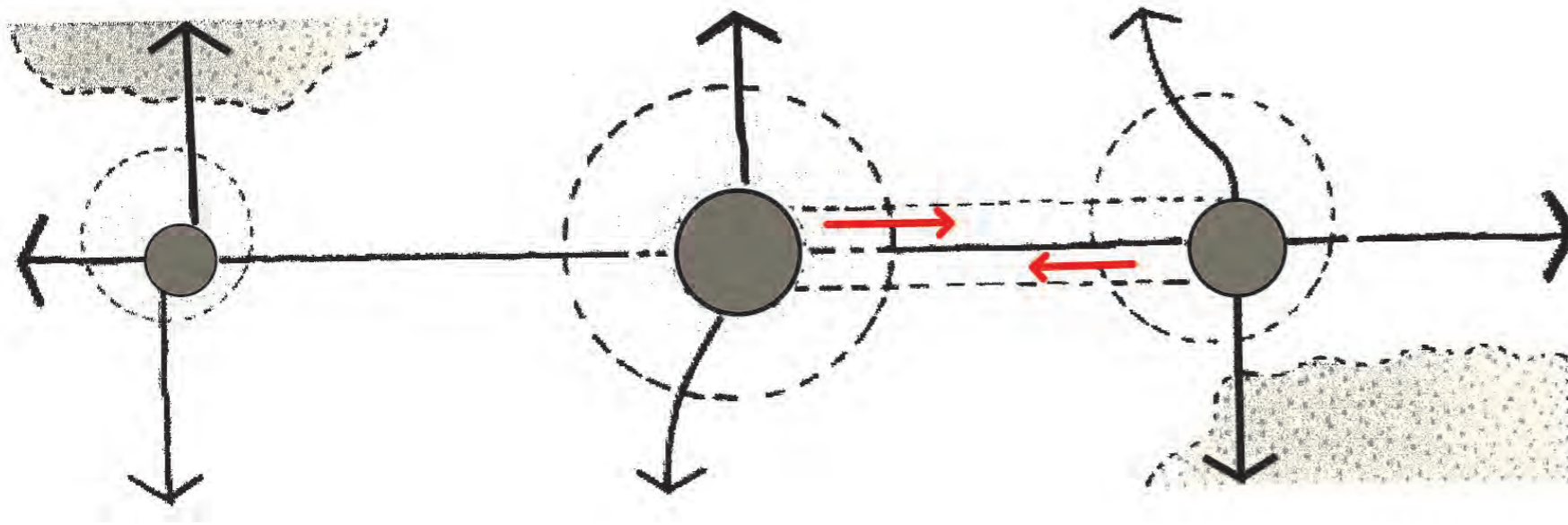


Figure 19: Corridor Growth (Source: Adapted by Author from Dewar & Louw, 2013)

## MOVEMENT ANALYSIS

The radial rail and road patterns in Cape Town are focused on the Cape Town CBD. This has resulted in limited north-south linkages which does not accommodate the multi-directional movement patterns that have emerged in response to the decentralization of commercial and employment opportunities (COCT, 2006). The pattern of movement is not only considered as highly inefficient in terms of congestion, but the lack of adequate North-South and East-West movement axes means that transportation between these areas in the city, often occurs via the CBD. This emphasizes the aforementioned problems of higher travel time and costs for those located on the periphery to access other parts of the city. The Metro South-East in particular lacks adequate metropolitan movement linkages as the rail line which services this part of the city is not integrated with areas to the west nor the economic node of Belville in the North. It is also apparent that low-density residential development across the city does not support a viable city-wide public transport system. The failed radial patterns and lack of adequate public transportation for low income dispersed communities are represented in figure 20 and figure 21. Lastly, NMT is underprovided for and is often considered unsuitable due to poor road safety and street crime (COCT,2006).

## HIGHER ORDER PUBLIC INSTITUTIONS

The Issues relating to the failed radial patterns in Cape Town and the lack of transport integration between the metro South-East and the rest of the city is also illustrated by the location of higher order institutions (large hospitals and tertiary institutions), of metropolitan significance. Figure 22 shows that the majority of tertiary education, large hospitals, industrial activities and commercial nodes are situated along the N1 and Voortrekker Corridors and isolate the Metro South-East. This significant, because the Metro South-East houses the largest population and constitutes the majority of low-income households in the city. The location of higher order institutions at the metropolitan level reinforces the need for integration within the CTMA to give residents located in the South East access to socio-economic opportunities.

## GREEN SYSTEMS

The function of green systems (figure 23) is to restrict urban development. Green Systems consists of highly valuable areas in terms of either biodiversity or agricultural potential. The integrity of ecological processes and biodiversity occurs when green open spaces are linked via green corridors to promote the migration of species between them. At the metropolitan scale it is essentially the protection or enhancement of these corridors that guide or restrict urban growth towards a more compact city form, whilst also preserving rural food production and habitats (Gaston,2010).

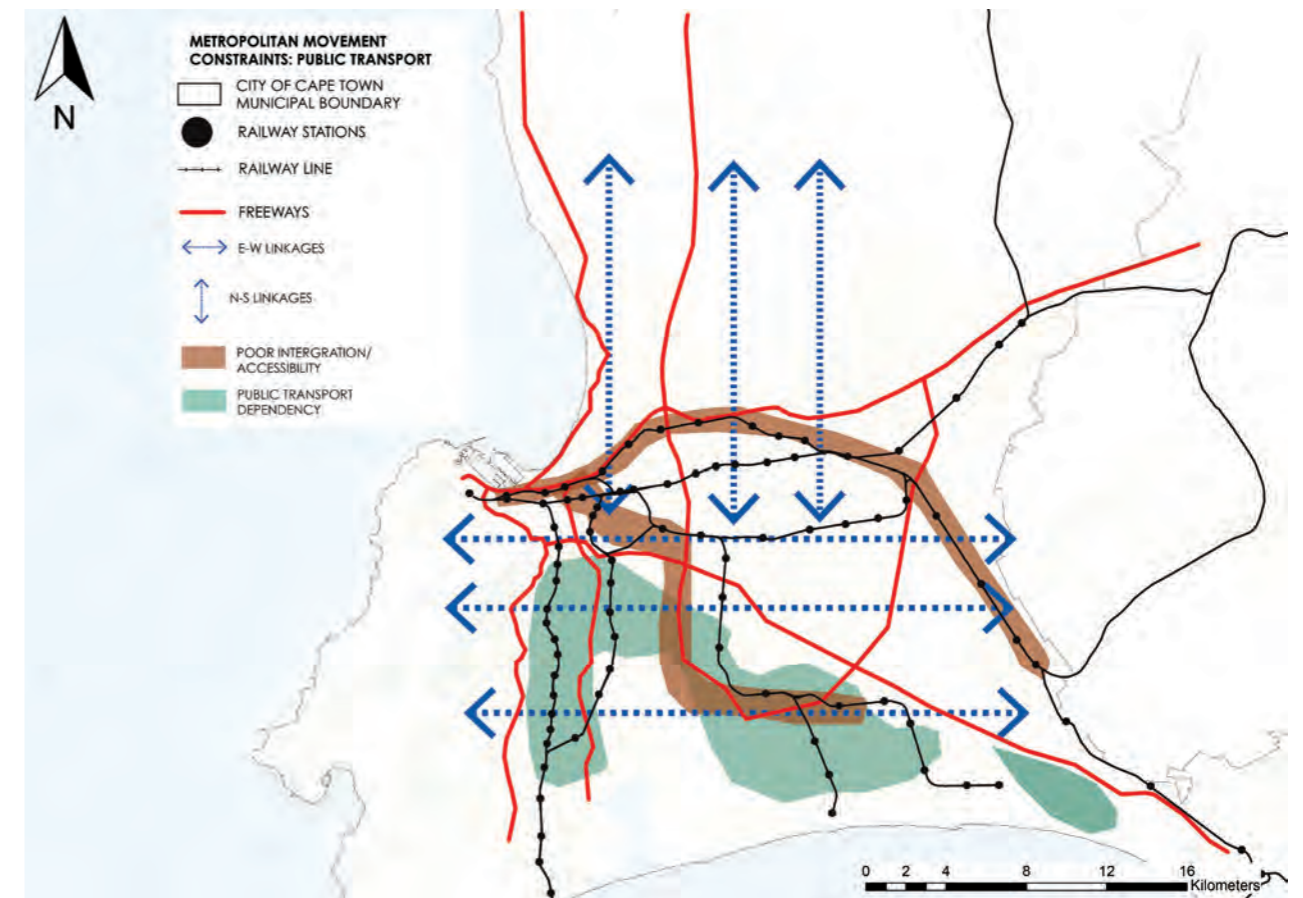


Figure 20: Public Transport Constraints in Cape Town  
(Source: Author; GIS Technical Library, University of Cape Town)

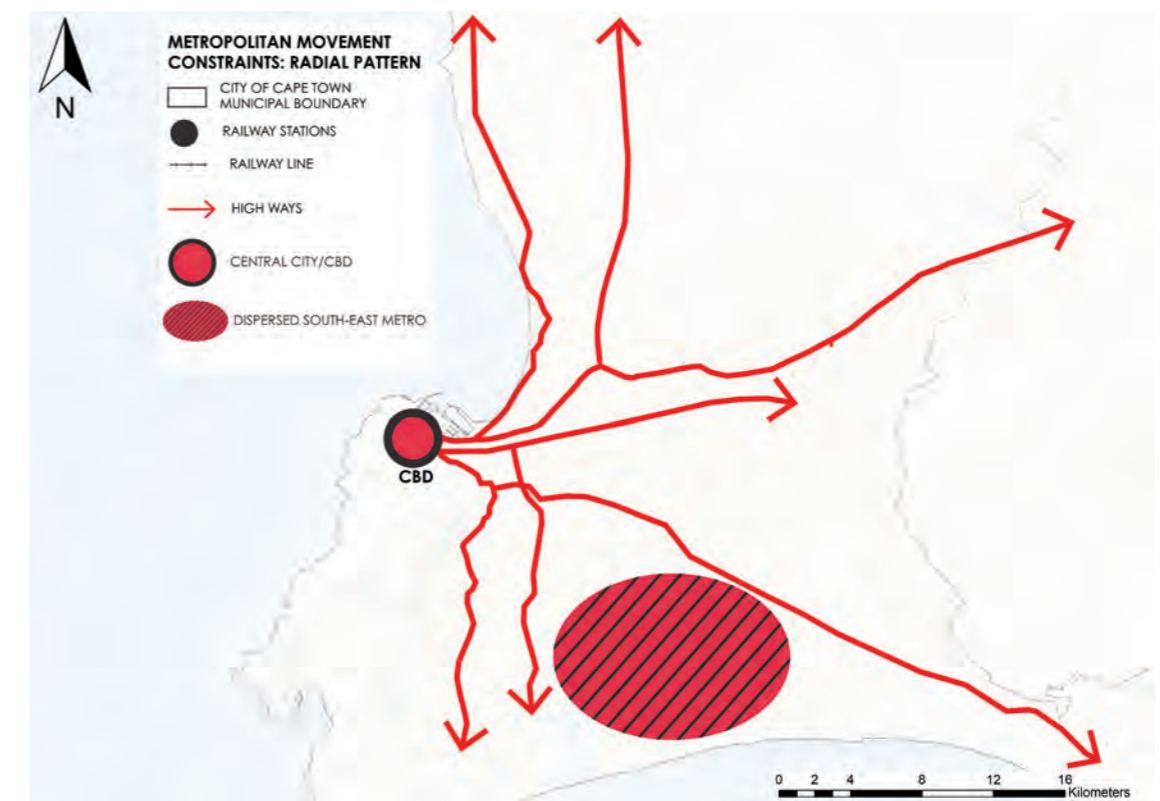


Figure 21: Failed Radial Patterns in Cape Town  
(Source: Author; GIS Technical Library, University of Cape Town)

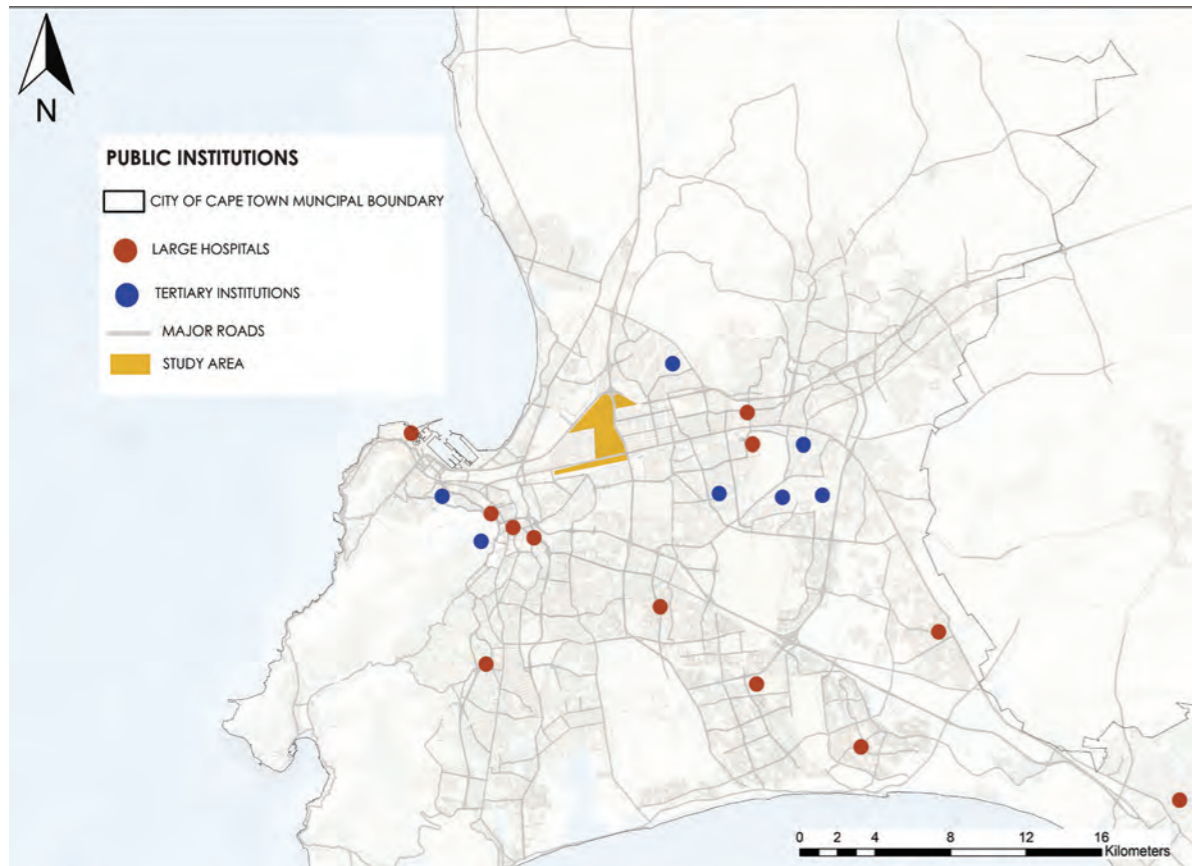


Figure 22: Higher Order Public Institutions in Cape Town  
 (Source: Author; GIS Technical Library, University of Cape Town)

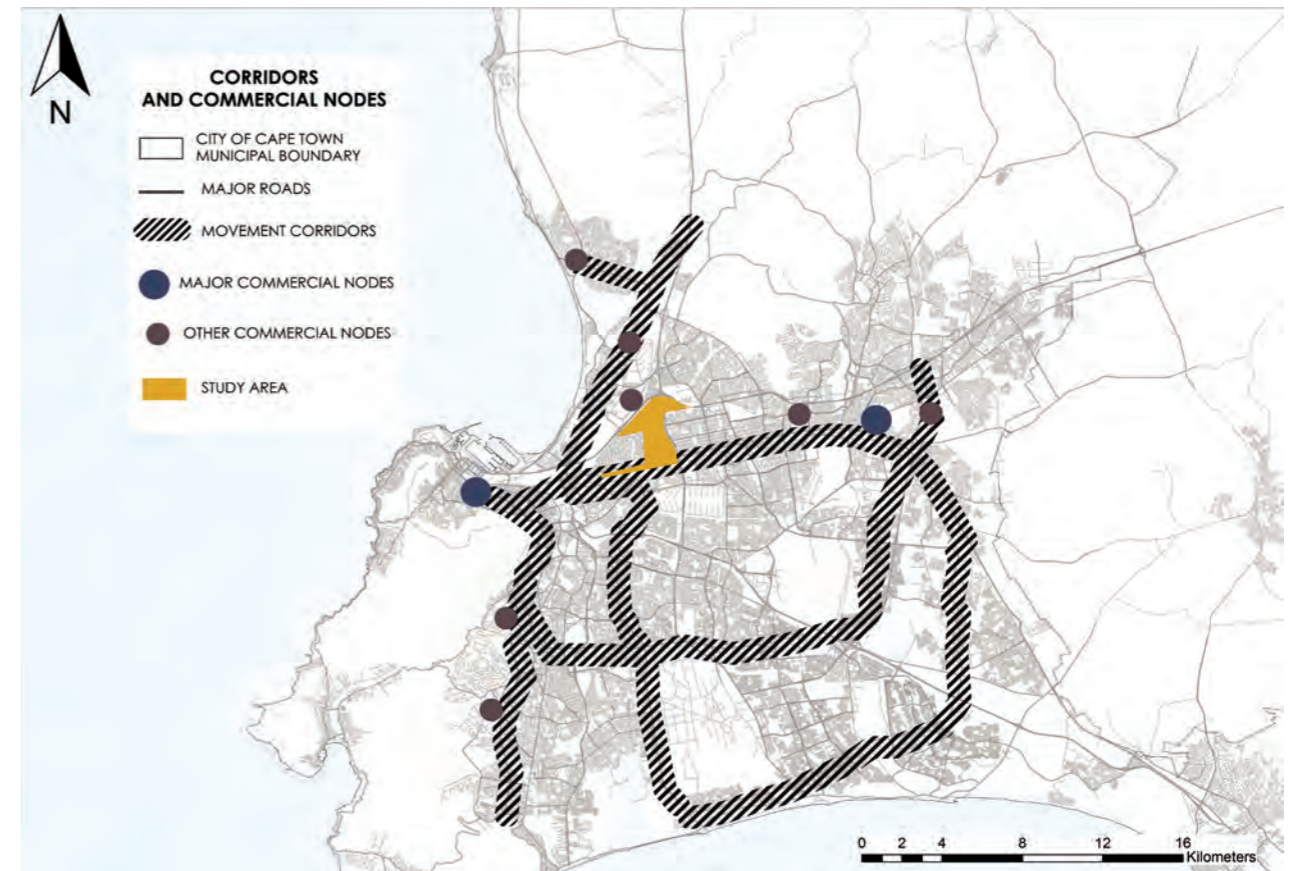


Figure 24: Movement Corridors and Commercial Nodes in Cape Town  
 (Source: Author; GIS Technical Library, University of Cape Town)

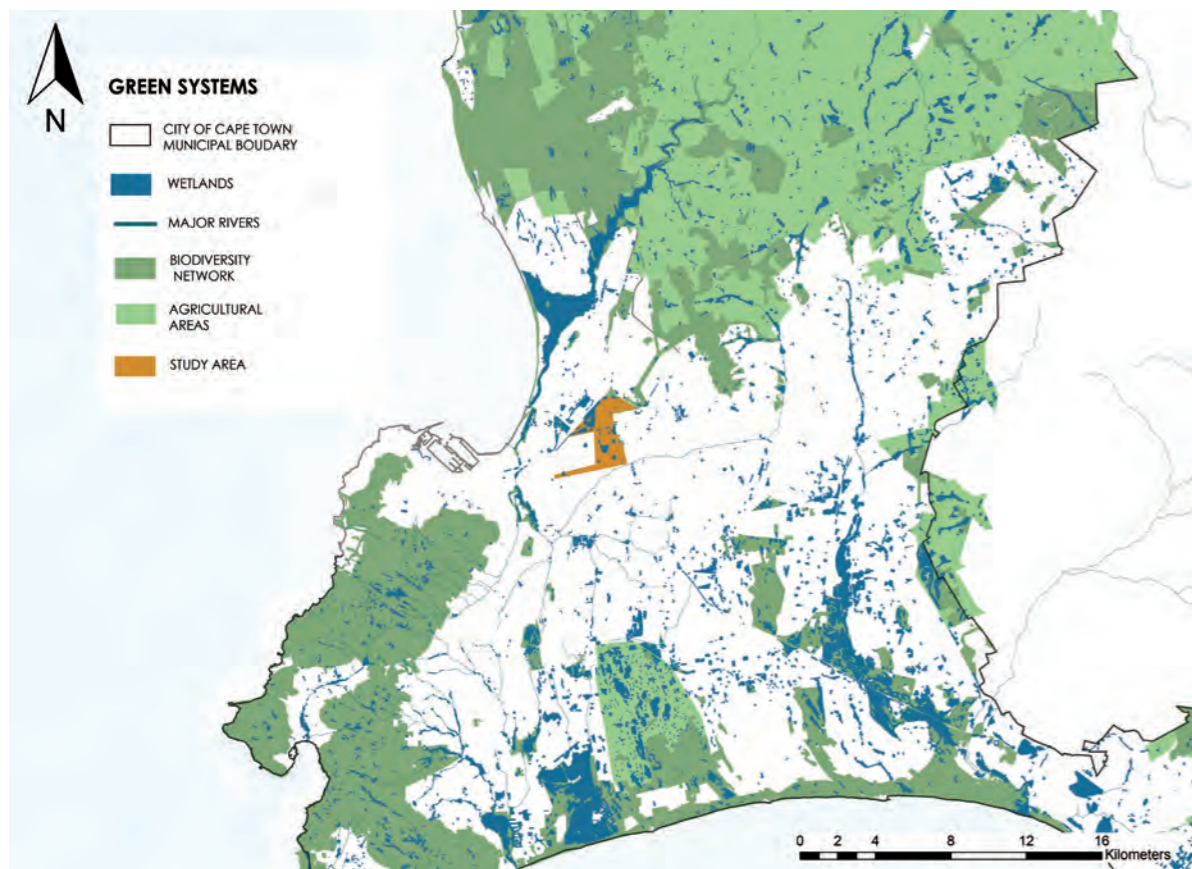


Figure 23: The Biodiversity Network in Cape Town  
 (Source: Author; GIS Technical Library, University of Cape Town)

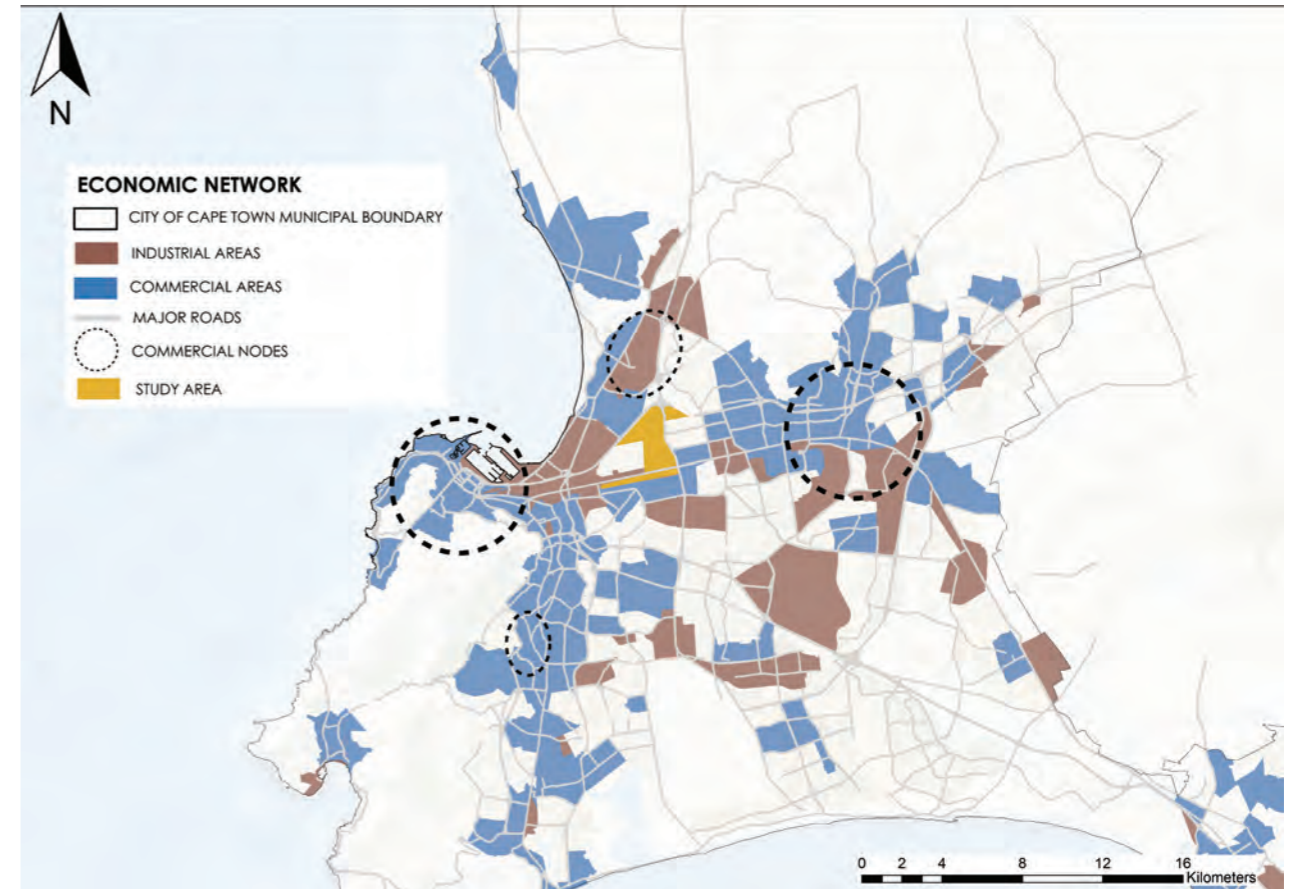


Figure 25: The Economic Network in Cape Town  
 (Source: Author; GIS Technical Library, University of Cape Town)

## METROPOLITAN CONCEPT

The metropolitan spatial concept begins with the establishment of green corridors and 'nature rooms' that serve to direct urban growth and preserve natural and valuable productive land. Thereafter, the metropolitan movement system is restructured to resemble a grid as opposed to a radial system. This will essentially occur through the creation of linkages between the current linear movement systems.

## BIODIVERSITY CORRIDORS

Green corridors are intended to connect areas of critical biodiversity by restricting urban development in such areas, which in turn serves to direct urban growth. Gaston (2010) states that green networks and corridors are influential in providing: connectivity; linking green spaces; and minimising the potential effects of fragmentation on wildlife. Green corridors also provide important recreational, leisure and nature experience for people (Gaston, 2010). The green corridors can therefore be considered a higher priority than fragmented areas of biodiversity. Figure 23 above shows the areas of critical biodiversity within the CTMA. However, these areas of biodiversity are not interconnected by any metropolitan green system and therefore lacks a hierarchy. In order to establish a system of green corridors, the biodiversity network for the CTMA was used as a means for connecting important ecological or biodiversity areas (figure 26,). This is crucial as it establishes a hierarchal system, which distinguishes between areas of biodiversity and those within green corridors which are of metropolitan significance. To this extent the metropolitan concept identifies various biodiversity corridors to ensure the ecological health and integration of the biodiversity areas within the CTMA. The outcome presents an integrated metropolitan biodiversity network consisting of various biodiversity ecosystems which are connected through these biodiversity corridors.

The concept of biodiversity corridors were also created to identify the various "Nature Rooms" (figure 27). These "Nature Rooms" are ecologically significant within the Cape Town biodiversity network as they consist of indigenous species, wetland areas and fertile agricultural lands. According to Dewar and Uytendogaardt (1991) the reservation of nature rooms determine where urban development should not go in order to maintain the urban-rural relationship. This occurs by removing the need for future remedial actions and serves to retain the unique character of the CTMA. To this extent areas of great ecological sensitivity or uniqueness, (for example: rivers, catchment areas and valuable remaining areas of fynbos) should be reserved. The form of land which is not reserved would then allow for continued urban development. Dewar and Kipiel (2012) argue that at the metropolitan level the aim should be to maintain a dynamic balance between three types of landscapes of society, namely, wilderness, rural and urban. As previously mentioned in many parts of country natural and productive land is being destroyed by urban development which results in the loss of productive agricultural land and amenity. At the metropolitan scale, agricultural rooms should therefore be reserved which allows the close proximity of small farms to urban markets ( therefore reducing distribution costs) and allowing for the productive disposal of urban wastes, for irrigation and fertilization purposes (figure 28).

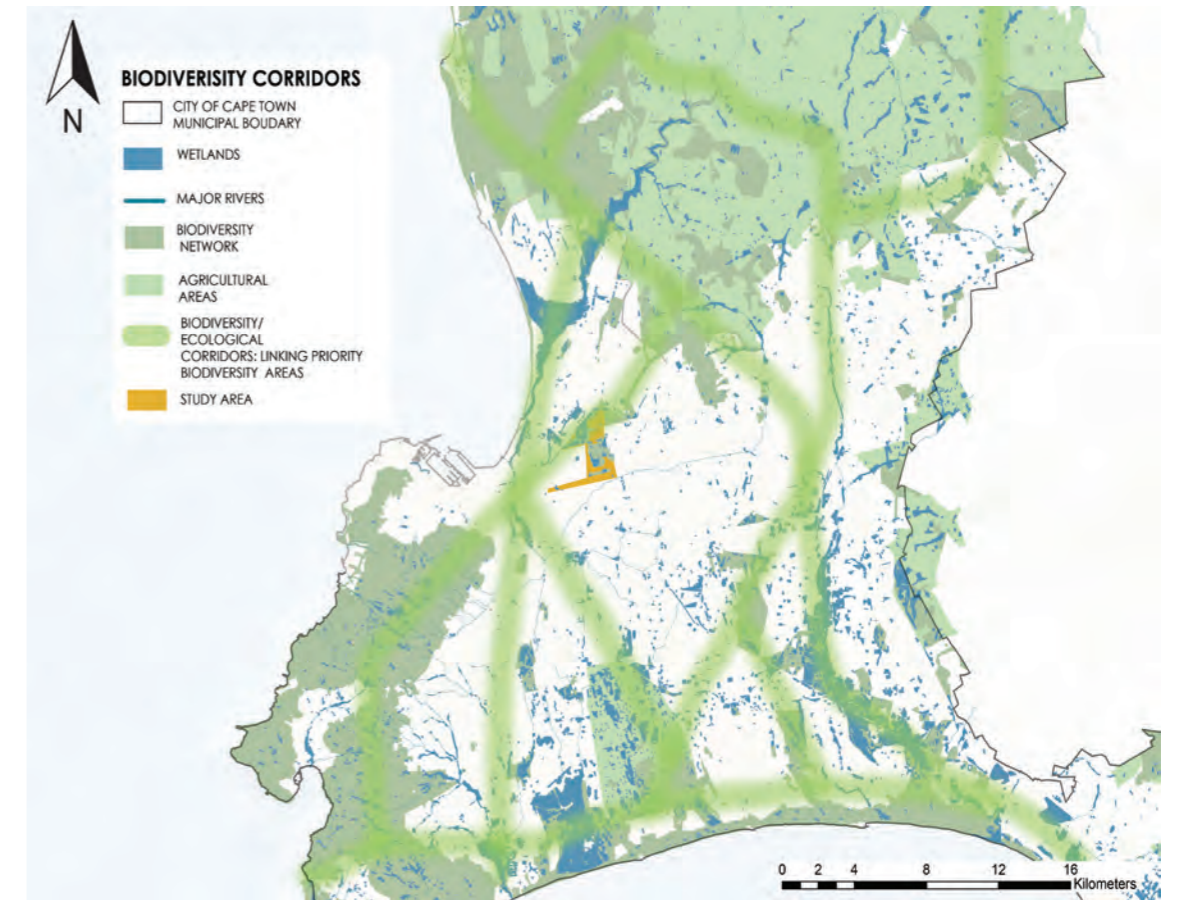


Figure 26: Biodiversity Corridors

(Source: Author; GIS Technical Library, University of Cape Town)

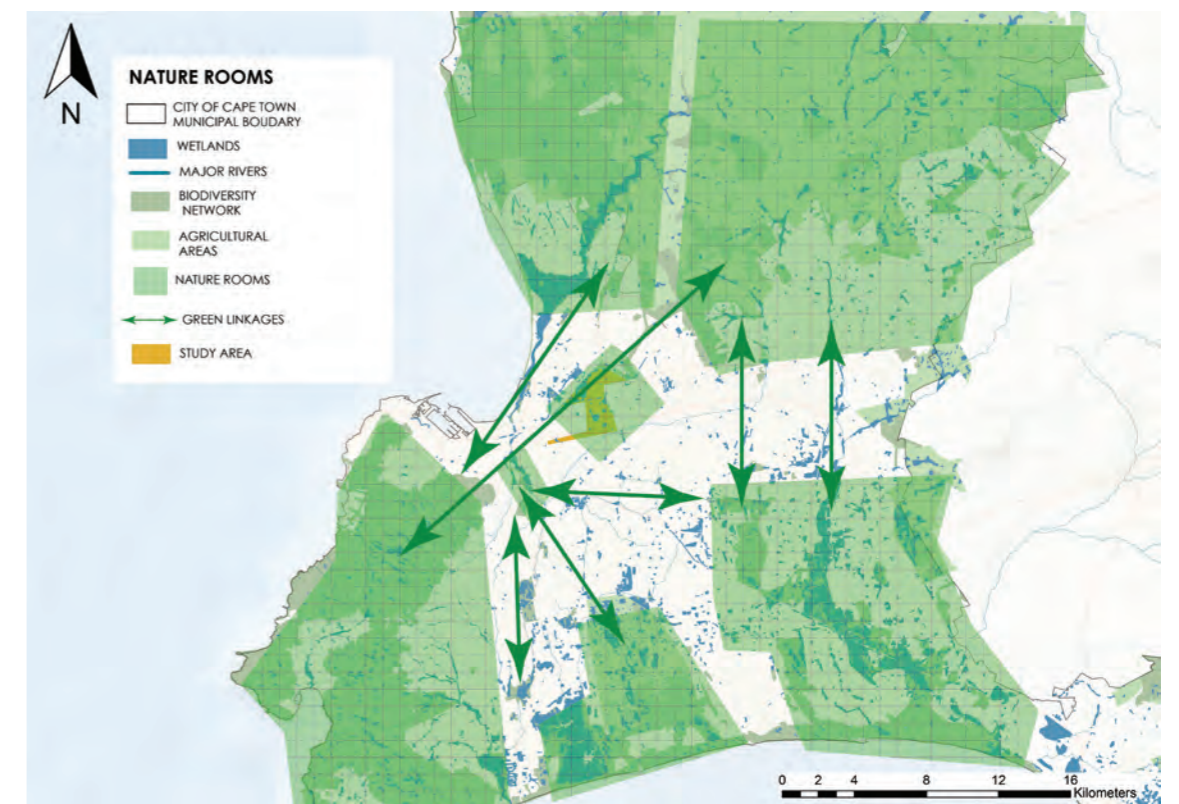


Figure 27: "Nature Rooms"

(Source: Author; GIS Technical Library, University of Cape Town)

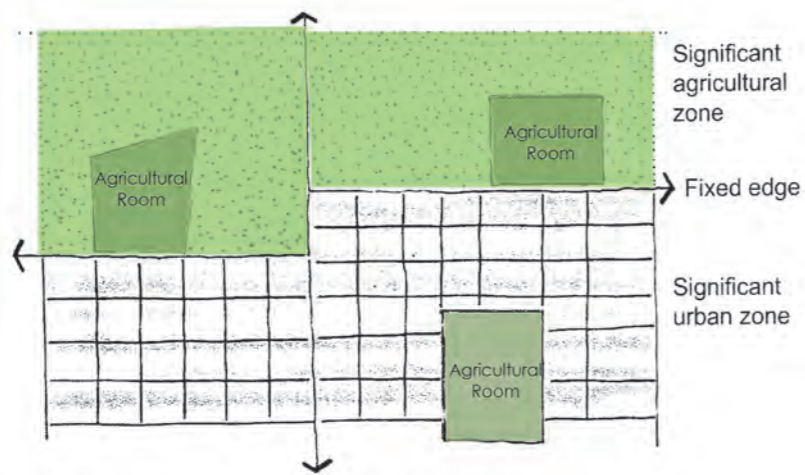


Figure 28: Diagram showing the proposed relationship between urban development and "agricultural rooms"  
 (Source: Adapted by Author from Dewar & Louw, 2013)

## MOVEMENT SYSTEMS

In terms of metropolitan movement, the spatial concept prioritizes the linking of current linear movement systems. The rail system, which is considered to be the highest order and most widely used mode of public transport, in terms of metropolitan significance, operates well with the proposed BRT system by closing gaps in the rail system. The metropolitan concept (figure 30) proposes the joining or closing of gaps between the current linear railways into a more efficient grid-like structure. The proposed BRT linkages will improve the metropolitan public transportation network ensures shorter and more direct trips and therefore a convenient and cheaper system. This system will essentially promote trans-metropolitan integration to offer the urban poor direct access to the socioeconomic opportunities which were previously inaccessible.

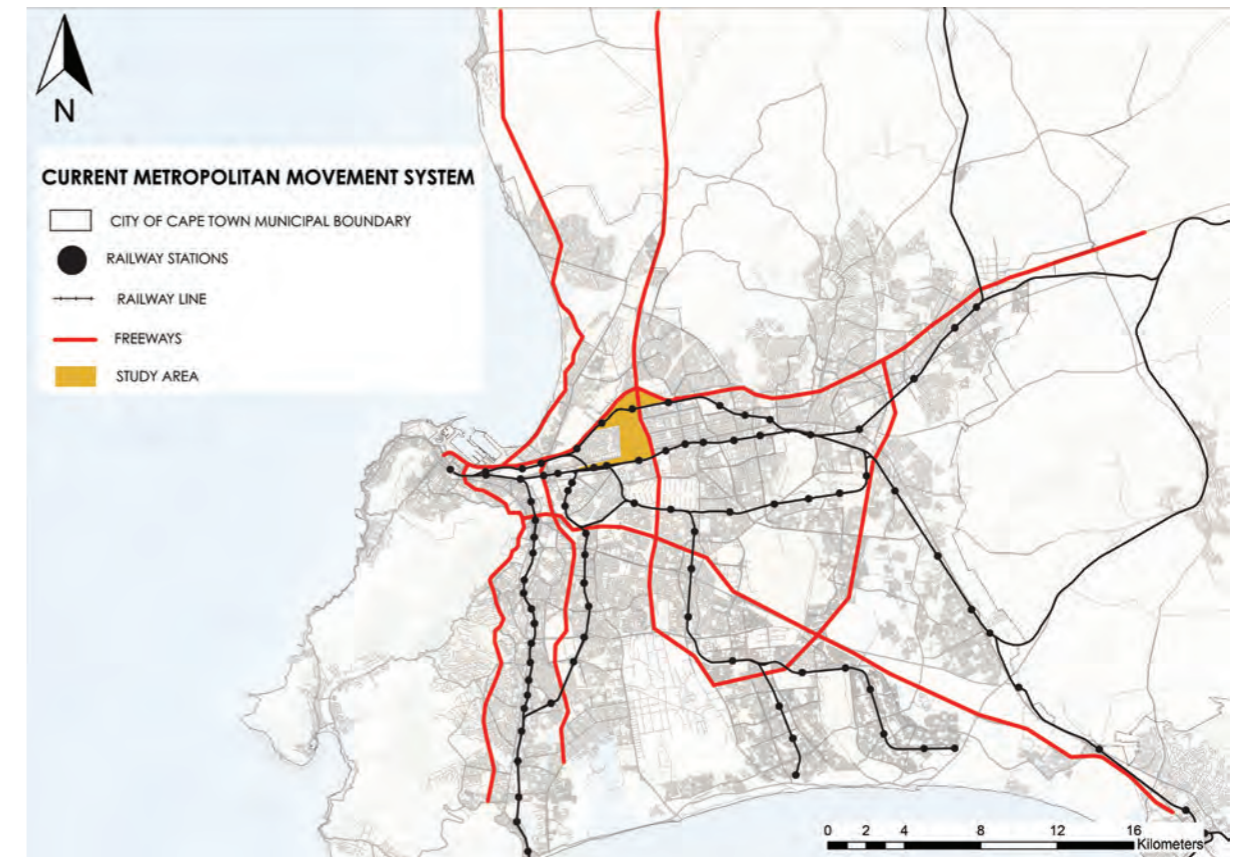


Figure 29: The existing metropolitan movement system  
 (Source: Author; GIS Technical Library, University of Cape Town)

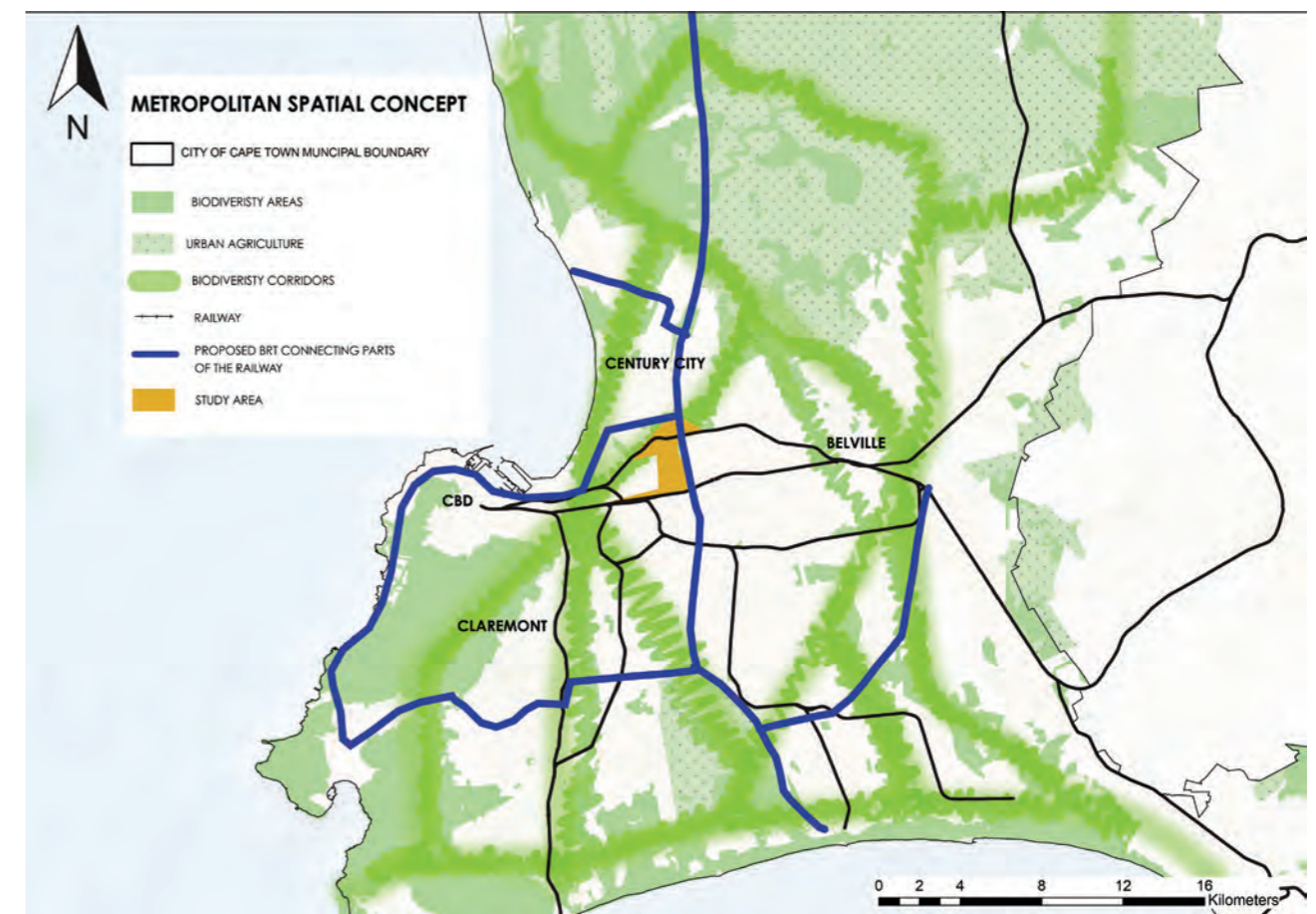


Figure 30: The proposed metropolitan concept  
 (Source: Author; GIS Technical Library, University of Cape Town)

## CHAPTER 7

### SITE AND ENVIRONS

The analysis of the site and environs involves dropping a level in scale in order to understand the surrounding environmental and structural informants that will impact on the design proposals for the Wingfield. The analysis will unfold in a systematic manner. It begins with an introduction of the study area, followed by an investigation of the natural systems components of the site. It then provides an evaluation of the structural or infrastructural components, which range from an analysis of the sub-regional movement patterns to an analysis of public facilities and settlement patterns.

#### THE STUDY AREA

The study area (figure 31) consists of the 650ha of land. This includes the Wingfield site, 3km radius of urban development surrounding the site, and the cemetery in the southern portion of the study area. The primary movement routes associated with the study area are the N1 in the north, the N7 to the east and the Voortrekker Road Corridor in the South. The two major residential neighbourhoods within the study area are Kensington and Goodwood. Century City and N1 city are the two major commercial nodes in close proximity to the site.

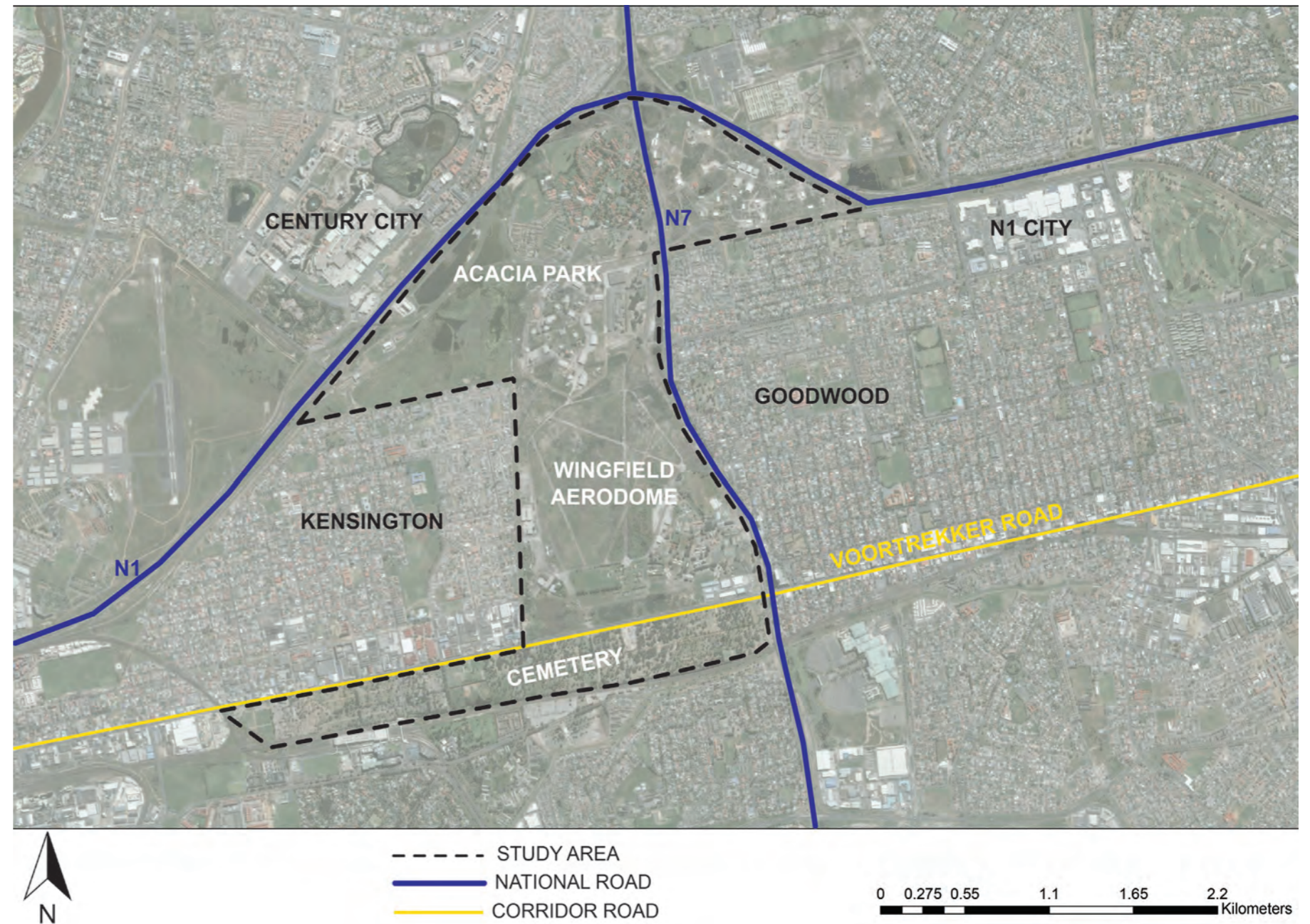


Figure 31 :Location of the Study Area (Source: Author; GIS Technical Library, University of Cape Town).

CATEGORY	INFORMATION REQUIRED	GUIDELINES OR REASONING	CRITERIA	INDICATOR	DEVELOPMENT RESTRICTION	
<b>NATURAL SYSTEMS</b>						
<b>CLIMATE</b>	Avoid areas exposed to prevailing winds		High points/ hilltops	Avoid wind exposed peaks	No-Go	
			Low-lying areas/ valleys	SW-NE axis	Mitigate with design measures	
	Avoid cold slopes		Human comfort	South facing slopes	No-Go	
	Avoid cold and wet slopes		Human Comfort	S-E facing slopes	No-Go	
	Warm slopes (Advantageous)		Human Comfort	North Facing	Suitable	
	<b>HYDROLOGY</b>	Protect River and Groundwater Quality	Hazard Avoidance	Wetlands		No-Go
				Large Rivers	30-50 m buffer	No-go
				Flood Plains	1:50 year flood plain 1:100 year flood plain	No-Gp
				Aquifers	Flood prone areas Sensitive or threatened	No-Go
<b>BIOTIC SYSTEMS</b>	Protect Ecosystems and Biodiversity		Critical Biodiversity Areas	Core 1 Core 2	No-Go No-Go	
			Open Space Areas and Grave Yard	Seek and Rescue	Tread Lightly	
			Biodiversity Area	Compromised	Suitable	

CATEGORY	INFORMATION REQUIRED	GUIDELINES OR REASONING	CRITERIA	INDICATOR	DEVELOPMENT RESTRICTION
<b>NATURAL SYSTEMS</b>					
<b>GEOLOGY</b>		Avoid Geological Hazards: No building on potentially unstable soils (fault lines)	Foundation Conditions		No-Go
		Value: No building on mineral resources of potential extractive value	Mining	Feasible Quantities	No-Go
<b>SOILS</b>		Stability: No building on unstable soils (e.g. swelling clays)	Clay content	<15%	Suitable
		Preserve Natural Resources: • Productivity: Classify soils according to agricultural productivity	Agricultural Potential	Medium or Higher	No-Go
		•No building on: -Good Soils -Moderate Soils			
		Preserve Natural Resources	Building Sand		Tread Lightly/ Opportunity
<b>TYPOGRAPHY</b>		Ridge Lines: No building on Ridge Lines			Unsuitable
		Avoid Steep Slopes: No development on slopes steeper than 9 degrees	Slope	<9 degrees	Suitable

Table 1: Method Used to assess the constraints of each Biophysical element (Source: Author,2015)

The various constraints are categorized according to the extent that development could be supported or restricted:

No-Go: restricts all urban development, as development cannot be supported by the biophysical characteristics present in the area.

Tread Lightly: Tread lightly requires any development proposal to be limited in its intensity

Tread Lightly /Opportunity: requires that a proposed development be limited in its intensity, while simultaneously capitalizing on possible resources in the area.

Suitable: This category deems the area suitable for urban development.

## NATURAL SYSTEMS ANALYSIS

The Biophysical elements of the study area consists an analysis of the Geology, Soils, Topography, Climate, Hydrology and Biotic System. This is presented in a systematic manner in order to determine the biophysical constraints and opportunities that will inform the spatial development of the Wingfield site. The analysis begins with an account of each biophysical element separately to establish the individual development constraints, which is offered by each element, which is then interpreted. The development constraints are then categorized according to development restrictions to determine where development is supported by each element. Lastly, a composite map combines all the individual Biophysical development restrictions that will serve to inform the development potential of the Wingfield site.

## HYDROLOGY AND TOPOGRAPHY

The topographical and hydrological characteristics of the study area work in conjunction with each other as the topographic slope and the location of hydrological features inform the drainage pattern in the study area. Drainage is crucial for the urban development process, especially for the implementation of sustainable urban drainage systems (SUDS) which aim to aims to mimic the natural hydrological regimes and improve the quality, volume and rate of storm water run-off. Furthermore, it encourages infiltration to replenish groundwater (COCT, 2013). This section will provide an analysis of the two elements individually before analyzing them both in terms of the hydrological and drainage significance.

## TOPOGRAPHY

The terrain of the study area is extremely flat as indicated by the spaces between the contour lines in figure 32. This is with the exception of the rise of gradient in the north-eastern section situated at the foot of the Tygerberg Hills. The site then gradually slopes towards the southwest as shown by the pattern of the 2m contours.

## HYDROLOGY

The major hydrological features presented throughout the study area include the significant wetlands situated in the western and south-western portion of the study area as shown in figure 33. The Black River is the most significant river throughout the southern portion of the study area. The Black river drains the Tygerberg Hills (the north-western portion) of the study area and the east-facing slopes of Table Mountain. Furthermore, it enters the Atlantic Ocean at Paarden Island in the Table Bay District (State of Rivers Report,2005).

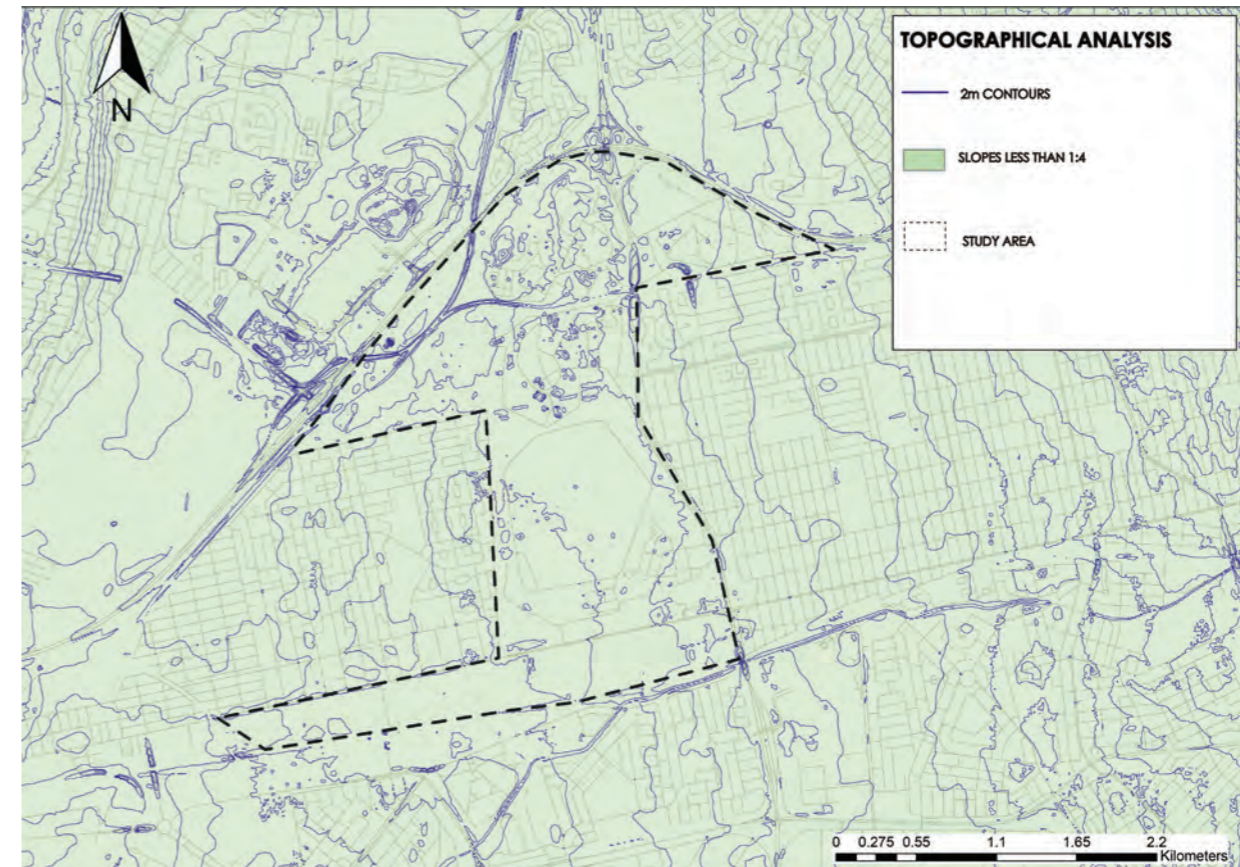


Figure 32: Topographical Analysis (Source: Author; GIS Technical Library, University of Cape Town).

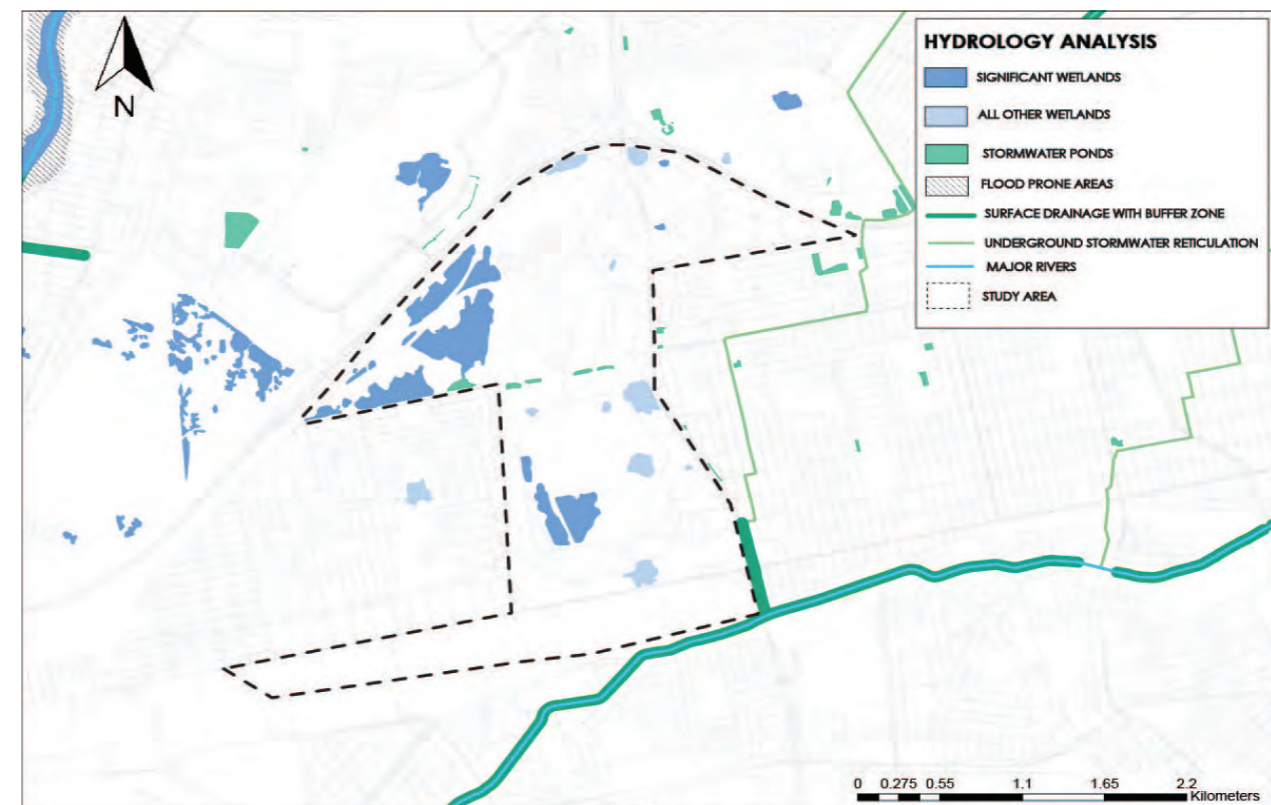


Figure 33 : Hydrological Analysis (Source: Author; GIS Technical Library, University of Cape Town).

## HYDROLOGICAL CONDITIONS

The topography of the study area and the direction of the Black River indicates that the water drains through the study area from north-east to south-west. The large number of wetlands and the slight gradient implies that the natural drainage may not be sufficient throughout the study area, and a structural modification of the Wingfield site may be necessary. This will essentially contribute to the viability of the intensive urban development. The significant wetland area in the western portion of the study area also requires protection from urban development as it holds biodiversity and flood attenuation significance. SUDS facilities or structures such as detention ponds and treated wetlands can assist in removing pollution and reducing downstream flooding (COCT, 2013). The hydrological conditions for the study area presented in figure 34.

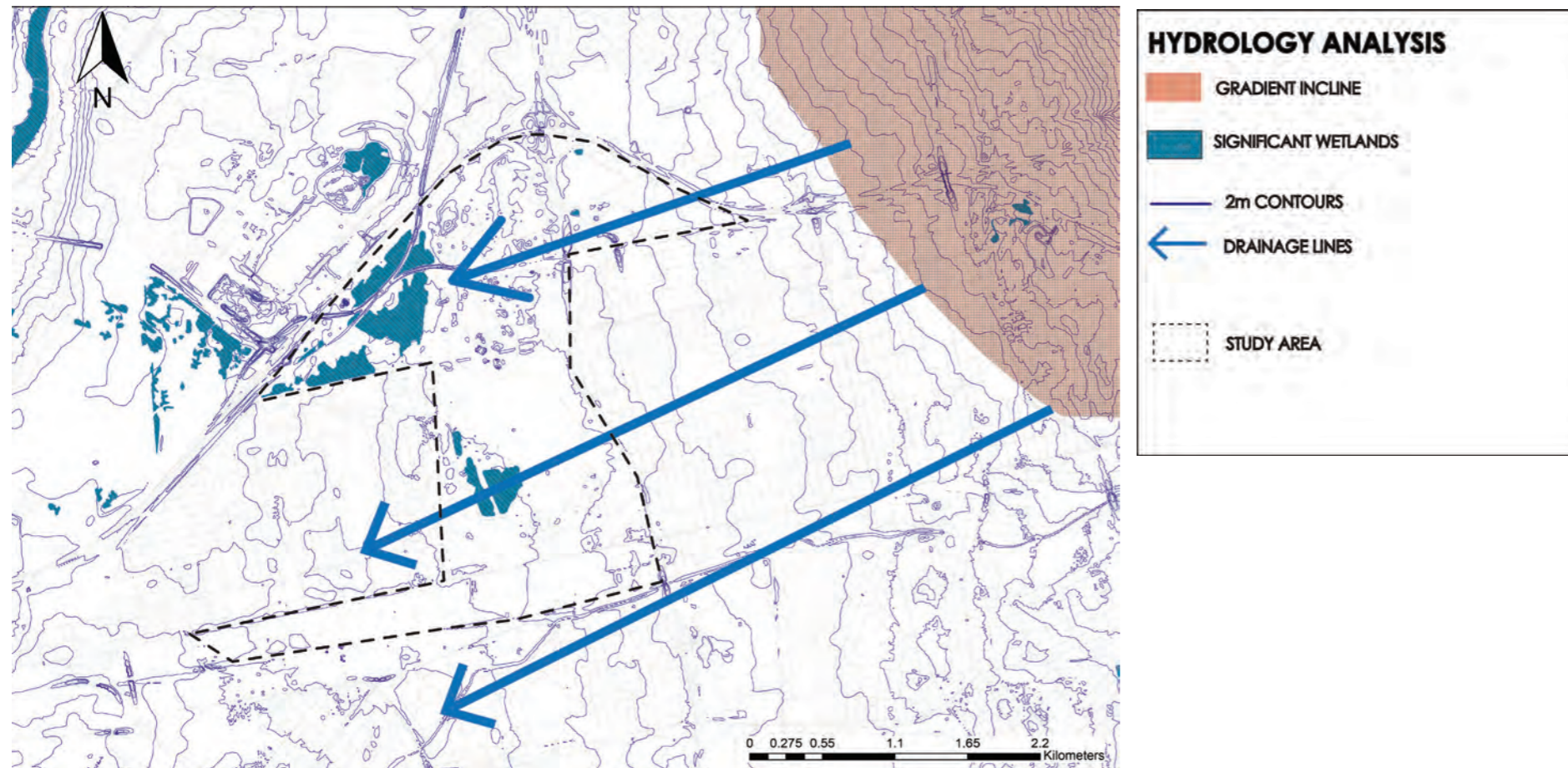


Figure 34 : Hydrological Conditions (Source: Author; GIS Technical Library, University of Cape Town).

## GEOLOGY

The underlying rock formation of an area, namely, the geology, is the foundation of its physical environment. The geology of an area also gives rise to various soil types which influences the indigenous fauna and flora of an area, as well as the agricultural practices (COCT, 2011). The dominant bedrock present in the study area is the Malmesbury group rock. This group is suitable for both urban development and agriculture. Furthermore, the groups consists of fine-grained, highly fractured rocks which weather quite quickly and are covered by soil or wind-blown sand in the majority of cases (Compton, 2004). More significantly, there are also no geological hazards such as fault-lines present in the study area. The study area is covered by the relatively recent Quaternary Springfontyn formation, which belongs to the Sandveld Group. The Springfontyn Formation was developed through the deposition of windblown sand, consisting of reddish to grey, unconsolidated quartzose aeolian sand and is most common in the flatter parts of the study area (COCT, 2011).

## SOILS

An analysis of the soil is concerned with the types of soils, the stability of the soil and the agricultural or productive potential of the soil. The soil's agricultural potential is an important attribute that requires protection from urban development, especially because of the implications this has for cities in terms of food security. Agricultural potential is said to be an expression of the internal attributes combined with the necessary external inputs required for agricultural production (MacVicar, cited in, Geyer et al, 2010). The properties which are used to determine the attributes of the land include the texture of the soil, its structure, chemical composition, mineralogical composition, parent material, depth, slope and drainage. Furthermore, Agricultural potential is usually determined using alternative historical values such as production, volume or the net turnover per area measured over a period of time. Given the lack of quality historical data, and that land with low-quality attributes requires a high level of external inputs, the agricultural potential of a region can be expressed as high, medium, or low.

The soils within the study area are characterized by light grey to pale-red sandy soil. These soils are sandy in texture with subsurface accumulation of organic matter, iron and aluminum

oxides as well as either deep or hard or weathering rock (COCT,2011). Furthermore, the shallow, acidic, sandy soils are structureless and generally nutrient poor (McVicar, 1991, cited in, COCT, 2011). Figure 35 shows that in terms of the study area the soil is classified as “developed” and therefore does not include fertile soil suitable for urban agricultural activities. This would imply that soil fertilisation processes are required for these activities. The soil conditions (depicted in figures 36-37 below also show that the the study area consists of a high level of development potential and is the most desirable development option.

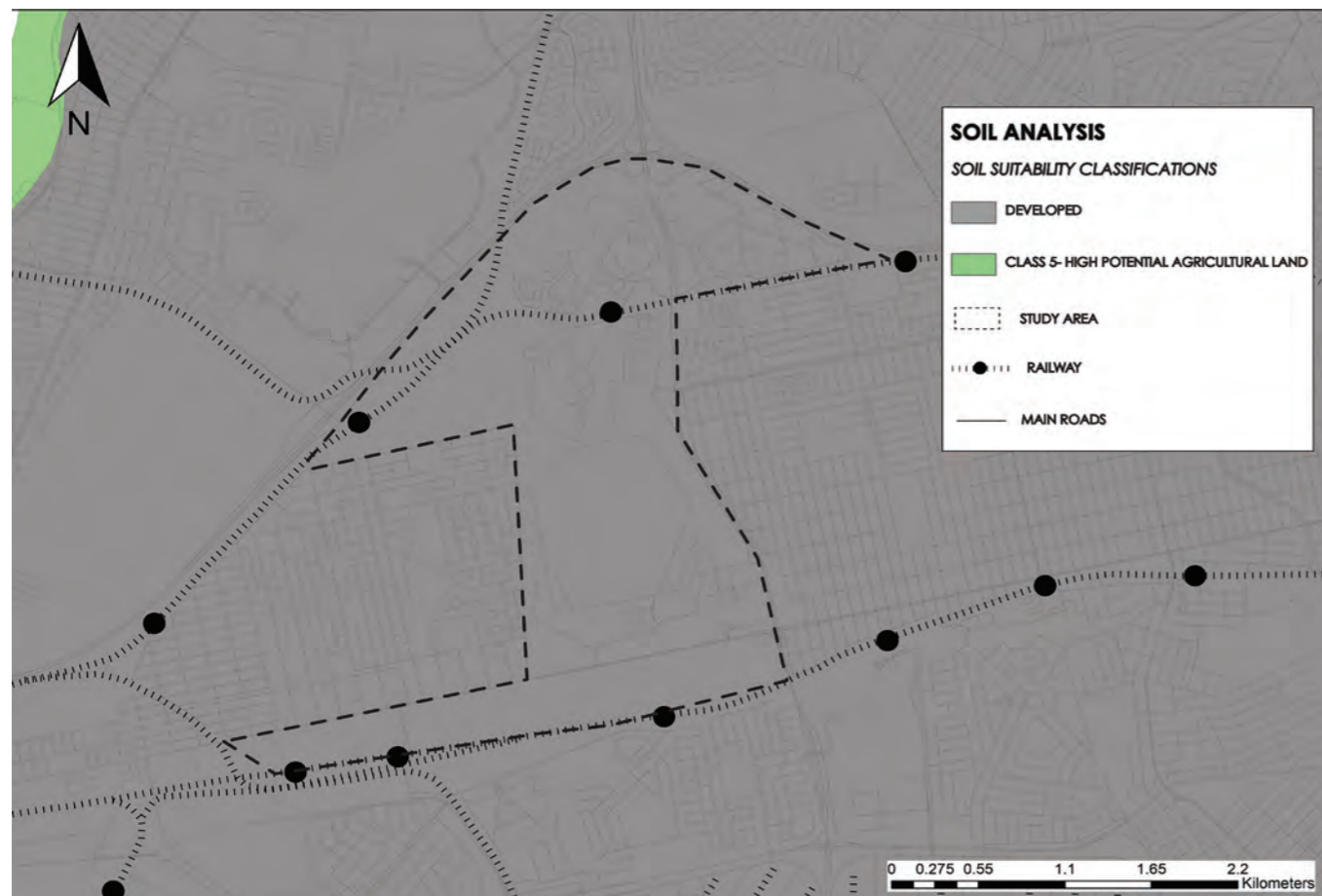


Figure 35 : Soil Suitability (Source: Author; GIS Technical Library, University of Cape Town).

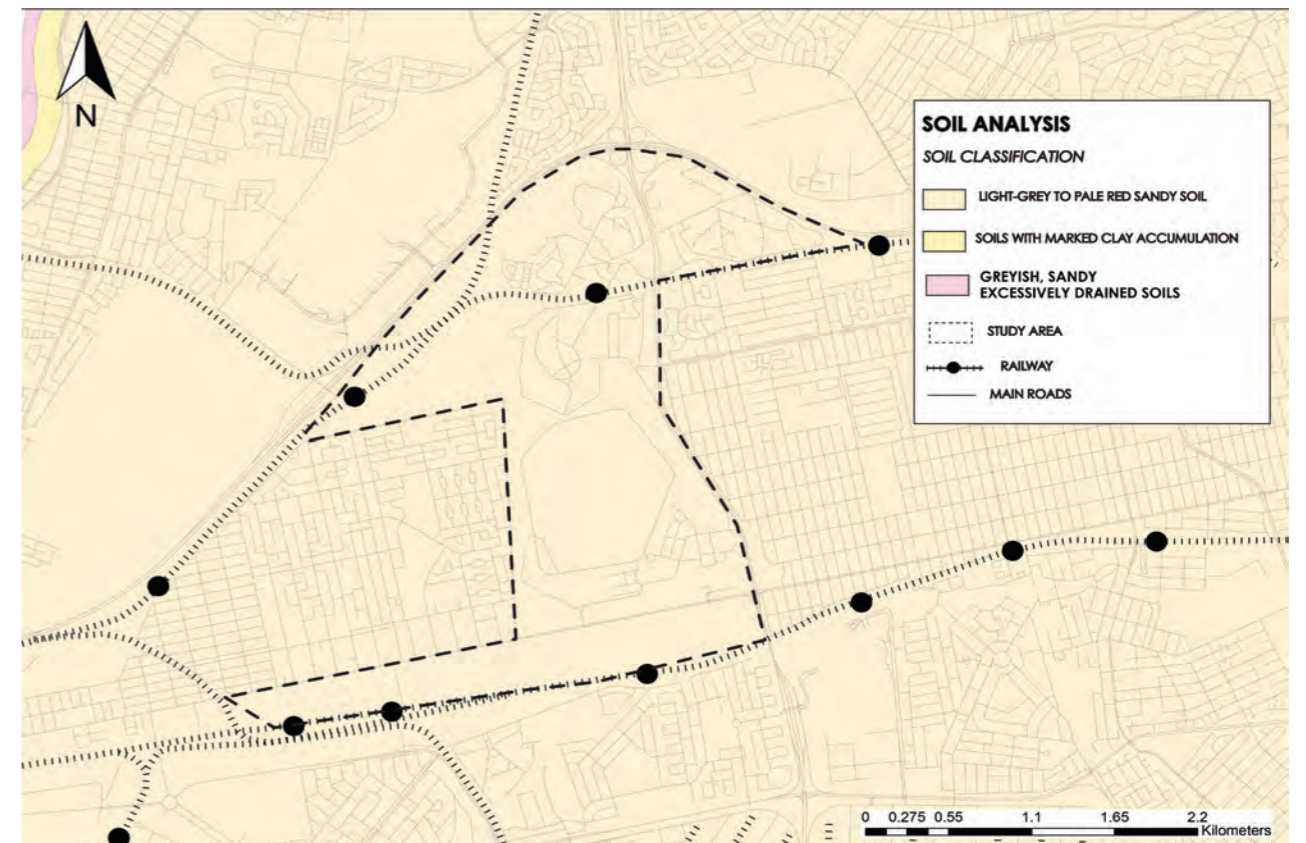


Figure 36 : Soil Classification (Source: Author; GIS Technical Library, University of Cape Town).

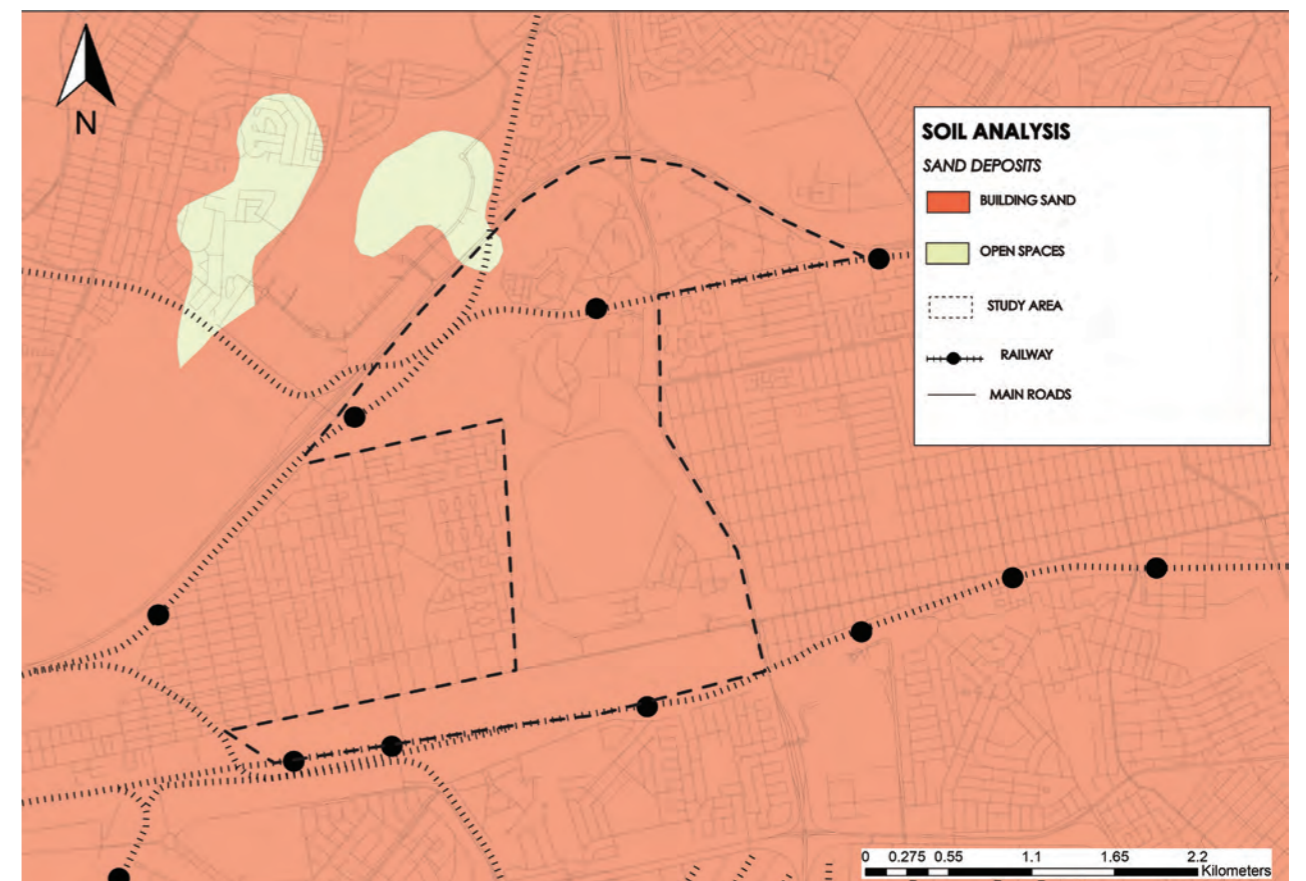


Figure 37 : Sand Deposits (Source: Author; GIS Technical Library, University of Cape Town).

## CLIMATE

Cape Town has a Mediterranean climate, with warm dry summers and cool wet winters. It is exposed to wind from the north-west in the winter months (associated with cold fronts and rain) and southerly or southeasterly winds during the summer. The South-Easter is said to be the most problematic as it reaches speeds in excess of 50km/h which results in high levels of discomfort for people in areas that are associated with loose sandy soil, such as in the case of the Wingfield study area.

The study area is large and very flat which means it is constantly exposed to predominant winds, which blow throughout the year. The high levels of rainfall during the winter months (especially in the months of July and August ) coupled with the inability of water to drain off the flat terrain, poses flood risks to the study area. A sustainable urban drainage system is therefore required to accommodate intensive urban development. Furthermore, the study area is situated in the Southern Hemisphere where the sun rises in the east and sets in the west, this has implications for building design and orientation of buildings, for example, north facing buildings will collect the most natural light and heat. It is suggested that the clustering of buildings and structural landscaping can be used to create shade in a Mediterranean climate.



Figure 39: Winter storms in Cape Town's informal settlements  
(Source: <http://www.africancentreforcities.net>)



Figure 38: Cape Town's climate consists of predominant winds. This picture depicts the extent of the South-Easterly winds in the CBD of Cape Town  
(Source: <https://www.ormsdirect.co.za>)



Figure 40: "The Cape Doctor" creating a sand storm on a beach in Cape Town  
(Source: <http://www.rhinoafrica.com>)

## BIOTIC SYSTEMS

The Biotic analysis was conducted by categorizing the various biodiversity areas in the study area. These biodiversity areas were categorized according to their biodiversity significance within the metropolitan context, which is shown by the metropolitan analysis. The biodiversity areas are depicted in figure 41. The aim of the analysis is to determine which biodiversity areas are “critical” in terms of not being able to accommodate urban development and those areas which have minimal biodiversity significance to accommodate intensive urban development.

The analysis is categorized into three classes of development restrictions as seen in the composite map indicating the biotic opportunities and constraints existing in the study area (figure 42). The first class is classified as “protected area” as it has major biodiversity significance and thus development is restricted in these areas. This includes all the biodiversity areas that are classified as “irreplaceable”, the protected wetlands and the Black River. In terms of metropolitan significance, it includes all the areas within the biodiversity network. The areas indicated as “tread lightly” allow for selective urban development when certain mitigation measures are implemented. Furthermore, it is noteworthy that the tread lightly areas are not within the biodiversity network in terms of metropolitan significance. The third class is defined as “developable area” and consists of little or no biodiversity significance for intensive urban development to occur.

The study area falls within the COCT metropolitan biodiversity network, it is therefore crucial that an ecological corridor be maintained along the western portion of the site, which ensures metropolitan wide ecological integrity. The southern portion of the study area consists of a large graveyard. The eastern portion of the graveyard is classified as ‘tread lightly’ because of its potential to serve as a passive recreational soft open space, in terms of development proposal for Wingfield. Furthermore it allows for development potential on both sides of the Voortrekker road corridor to occur. The western portion of the graveyard forms part of the metropolitan biodiversity network, and therefore remains a protected undevelopable area.

### Biophysical Opportunities and Constraints

Figure 42 presents a composite map of the various biophysical opportunities and constraints which exist in the study area, and an outcome of the various biophysical elements. This composite map includes three classifications of development restrictions. The first identifies all the critical biodiversity areas, wetlands and the western portion of the graveyard, which are classified as “No-Go” areas in terms of urban development. As stated, these areas hold metropolitan biodiversity significance. The wetlands present opportunities for managing surface water through sustainable urban drainage systems that will prevent flooding. Due to the fact that the study area holds no productive soil suitable for urban agriculture, a small portion of the biodiversity area will be

used for urban agricultural practices. The identification of the urban agricultural area is strategically placed to ensure continuation of the ecological corridor running through the site. The map also includes “tread lightly areas” which indicate where development can take place, if mitigation measures are implemented. These areas will require specialist knowledge and practices of professionals ( for example,environmental practitioners) to conduct search and rescue procedures which will support urban development. The Black River is also a significant risk for development and agricultural pollution and therefore a riparian buffer zone should be implemented to protect the river from any damage caused by the urban environment. The third and final classification includes the “developable area”, which has no development restrictions and fully supports intensive urban development.

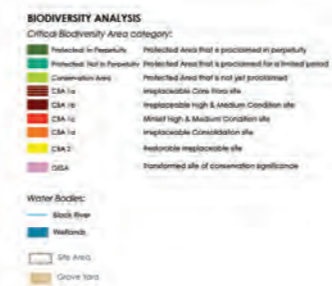
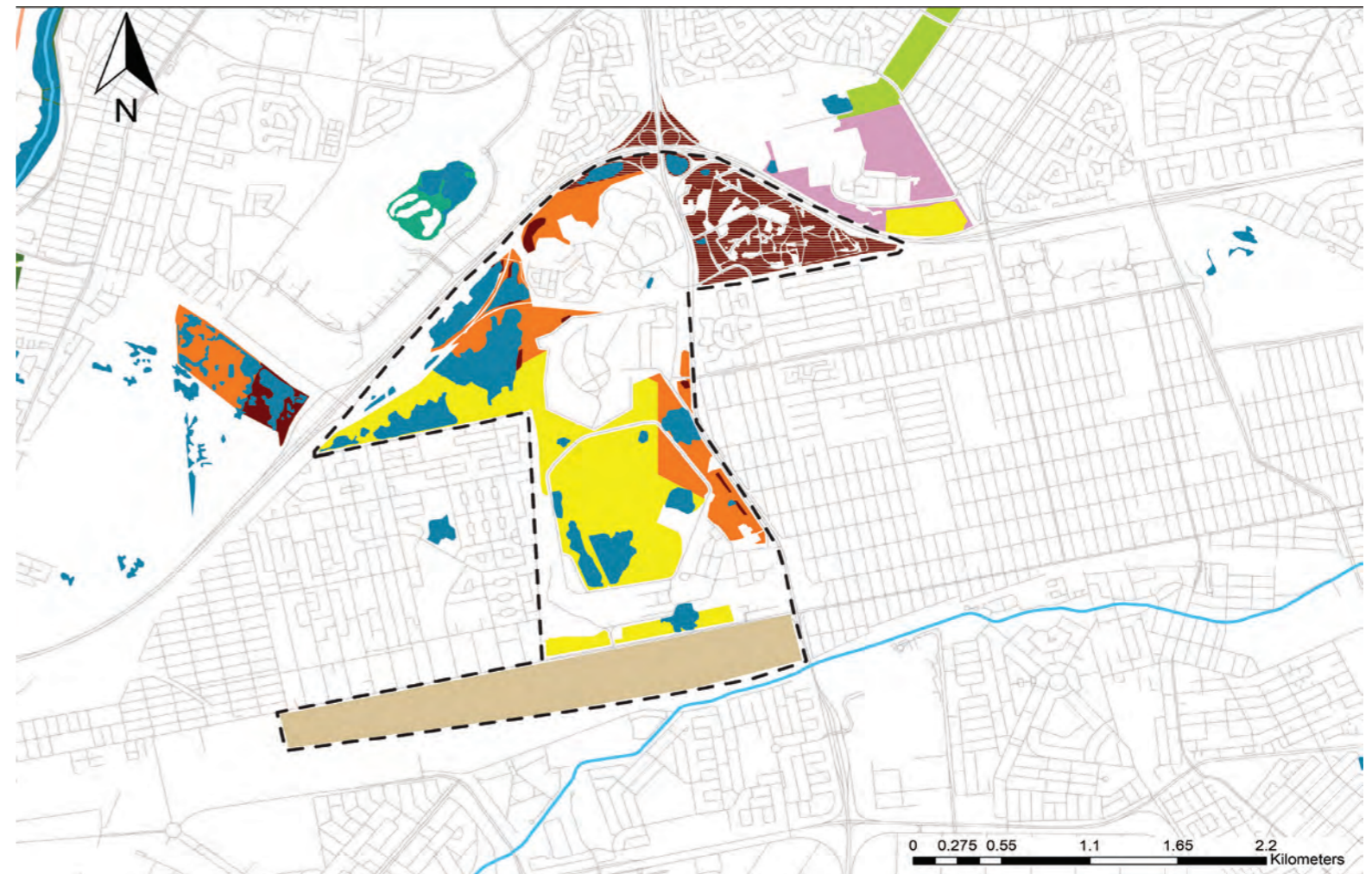


Figure 41: Biodiversity Analysis (Source: Author; GIS Technical Library, University of Cape Town)

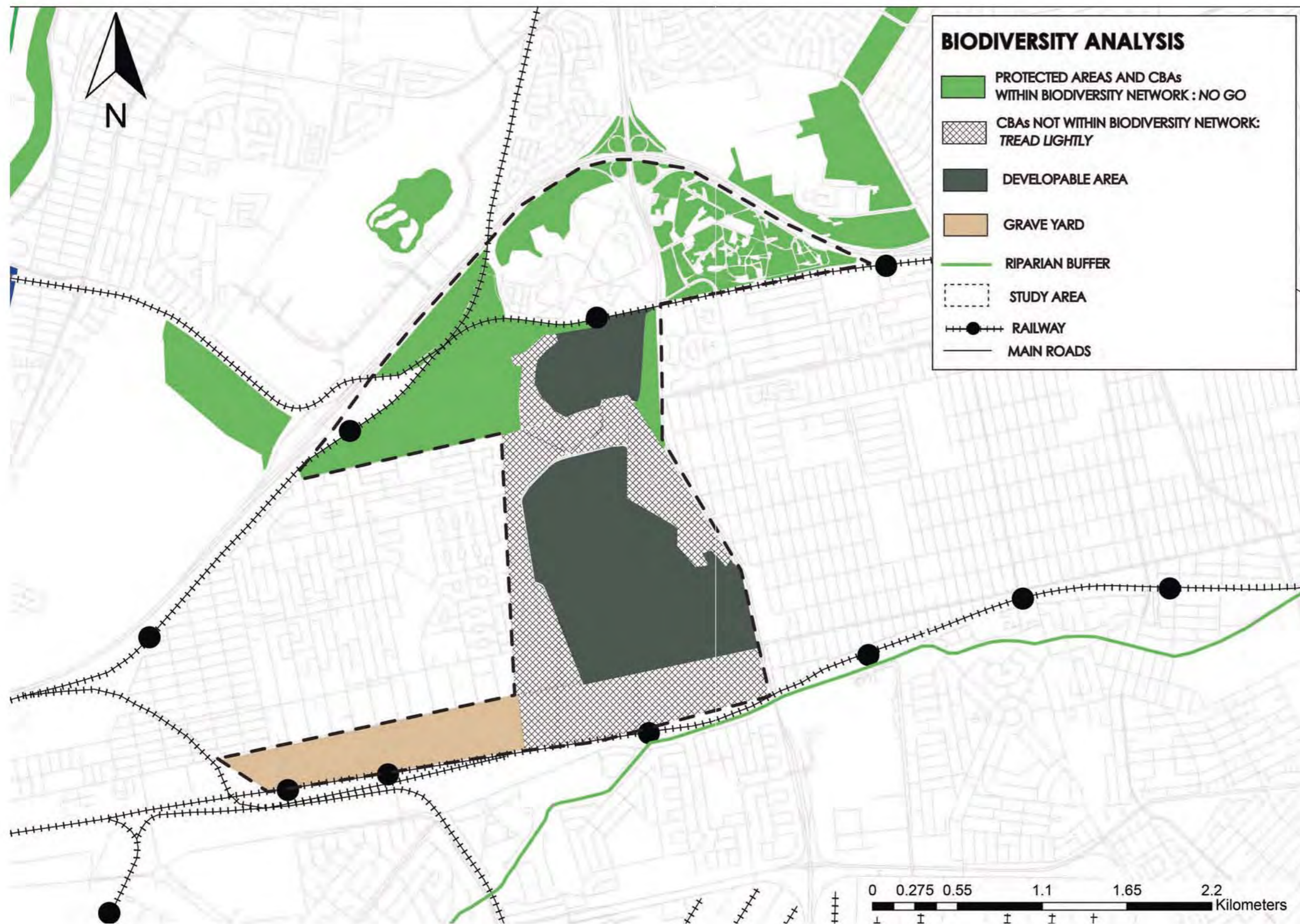


Figure 42: Biotic Opportunities and Constraints (Source: Author; GIS Technical Library, University of Cape Town)

## MOVEMENT SYSTEMS ANALYSIS

The movement analysis includes an evaluation of all modes of movement operating within the study area. This includes the movement hierarchy and the different modes of public transportation.

### MOVEMENT HIERARCHY

Figure 45 depicts the local movement network within the study area, which consists of various levels of vehicular movement offering different opportunities for accessibility. This will impact on the design of development outcomes for Wingfield and its ability to integrate with surrounding areas. The higher order movement system offers limited opportunities for access, compared to lower order streets, which offer greater opportunity for access and local integration. The first level of the movement hierarchy includes the highways, the N1 and N7, which are both regional and national routes. Highways promote rapid vehicular movement with limited opportunities for access and integration and create physical barriers across the urban fabric. The lack of intersections and stopping points along these roads have negative fragmenting or barrier effects which have visual and social implications. To this extent they isolate the neighbourhoods, which they enclose. This makes movement between neighbouring areas difficult. This result is a lack of any hierarchal movement system and an urban environment where streets are devoid of any sense of place and legibility of settlement as a whole.

The second level of the movement hierarchy are express ways which are local high speed movement channels that offer limited opportunities for local access and integration. Primary Arterials constitute higher order activity streets, allowing for high-speed vehicular movement but also stopping and starting along its route. Frans Conradie Drive is an example of this kind of street offering the opportunity for a horizontal higher order activity spine through the proposed Wingfield site. The lower order streets include secondary arterials that function as local activity corridors and provide opportunities for access and integration by linking a number of local areas. Activities along these activity corridors respond to the flows generated along the routes. Voortrekker is a good example of this type of road and is significant in terms of the proposed Wingfield development; however, it should be reinforced with higher-density housing as this generates vibrant activity.



Figure 40: Example of an Urban Freeway/Limited Accessibility Route- N1,Cape Town



Figure 43: Voortrekker Road is an Activity Corridor characterised by linear commercial and business developments, light industry, institutions and social facilities (Source:Photograph Author,2015).

Figure 44: The Voortrekker Road Activity Corridor is characterised by direct access and interrupted movement flows, especially at public transport interchanges and traffic lights. This type of route is also pedestrian orientated in sections. (Source: Author Photograph, 2015).

PUBLIC TRANSPORTATION

Figure 46 shows the different modes of public transportation operating within the study area and the sub-regional context. This includes the metropolitan rail network, the local bus and mini-bus taxi routes. The analysis is crucial in ensuring the integration of the proposed Wingfield public transportation system, which will serve to reinforce the existing surrounding public transportation networks. The two rail transit stations located at the northern and southern portion of the Wingfield site, namely, Thornton and Akasiapark Stations, both offer opportunities for a vertical primary activity spine, which serve to connect the two stations through the site.

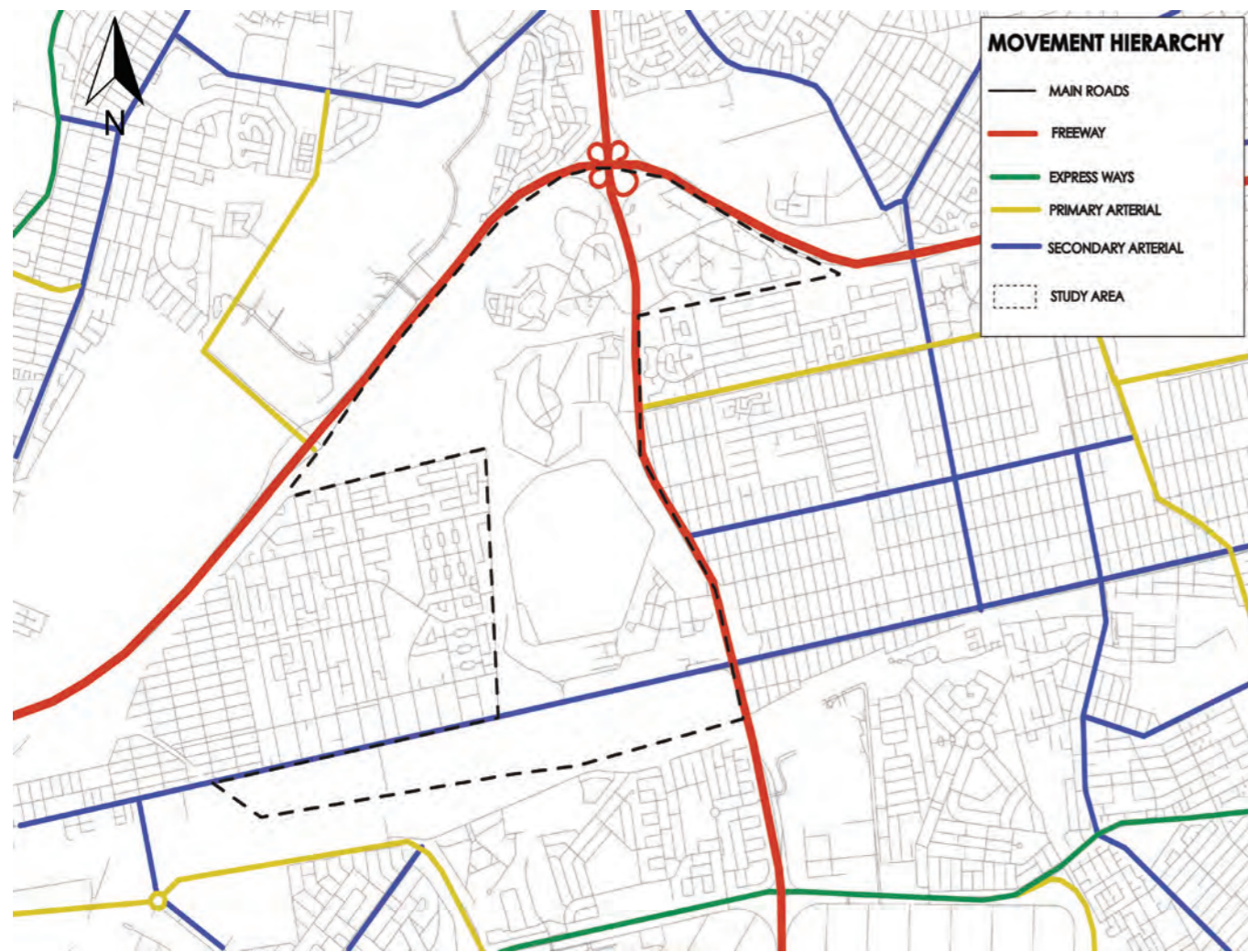


Figure 45: Movement Hierarchy (Source: Author; GIS Technical Library, University of Cape Town)

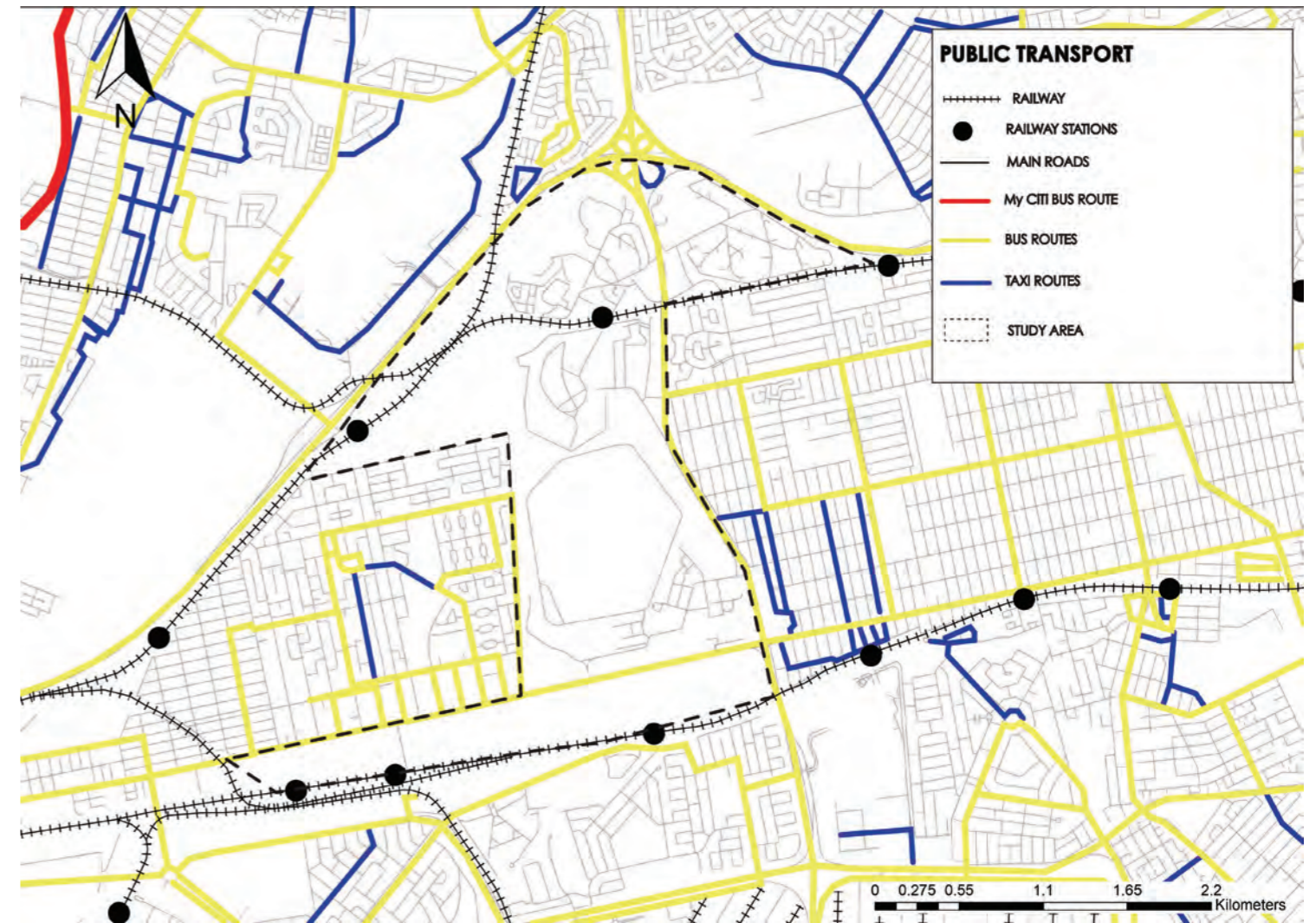


Figure 46: Public Transportation (Source: Author; GIS Technical Library, University of Cape Town)

## STRUCTURAL INFORMANTS

There are various structural informants within the study area that surround the Wingfield site as well as in the sub-regional context as depicted in figure 47. These structural conditions present the development opportunities and constraints, which inform the design outcomes of the Wingfield development proposals.

The structural constraints include the barriers in the north, east and south of the study area, and are considered 'blocked' in terms of their development potential. This includes the N1 in the north of the Wingfield site, the N7 in the east and the railway line in the southern portion of the site. Moreover, these structural constraints are development restrictions, which prevent both integration and accessibility.

The structural opportunities, on the contrary, present economic opportunities and facilities that will form the foundation, which the Wingfield development proposals can respond. Essentially, the opportunities are positive structural elements, which contribute towards development outcomes. The opportunities include, the Voortrekker activity corridor, which is considered a primary activity spine within the CTMA. It provides opportunities in terms of being an instrument for intensification to occur and allows the Wingfield site to become a corridor-reinforcing site. The Frans Conradie and Facticeon Road Activity spines provide the potential to create linkages through the Wingfield site. These connectivity routes provide the opportunity for integration to the N1 City and Century City commercial nodes. There are also two train stations situated in the northern and southern portion of the Wingfield site. These stations are generators of people and offer the potential for institutional and commercial activities as multi-modal transport interchanges that extend along the primary activity spine of the proposed Wingfield site and connect the two stations. Furthermore, these stations provide greater accessibility to the central city.

The proposed Wingfield site therefore serves to reinforce the central city (CBD), Century City and N1 city. The site itself also offers opportunities for intensification, increased densities; residential and mixed uses which potentially serve as integrators to the site and more importantly in terms of bringing opportunities to people.

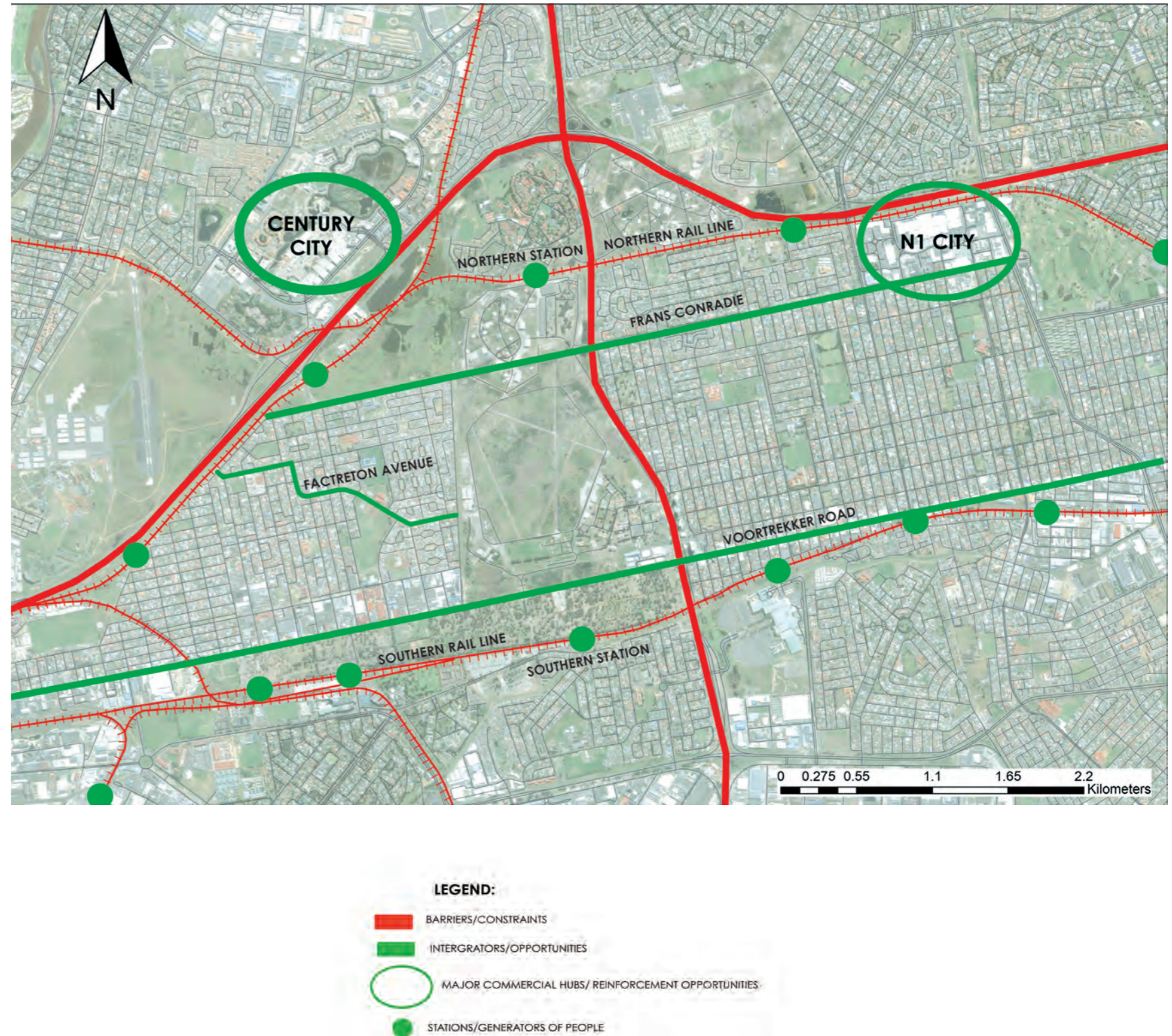


Figure 47: Composite Structural Informants (Source: Author; GIS Technical Library, University of Cape Town)

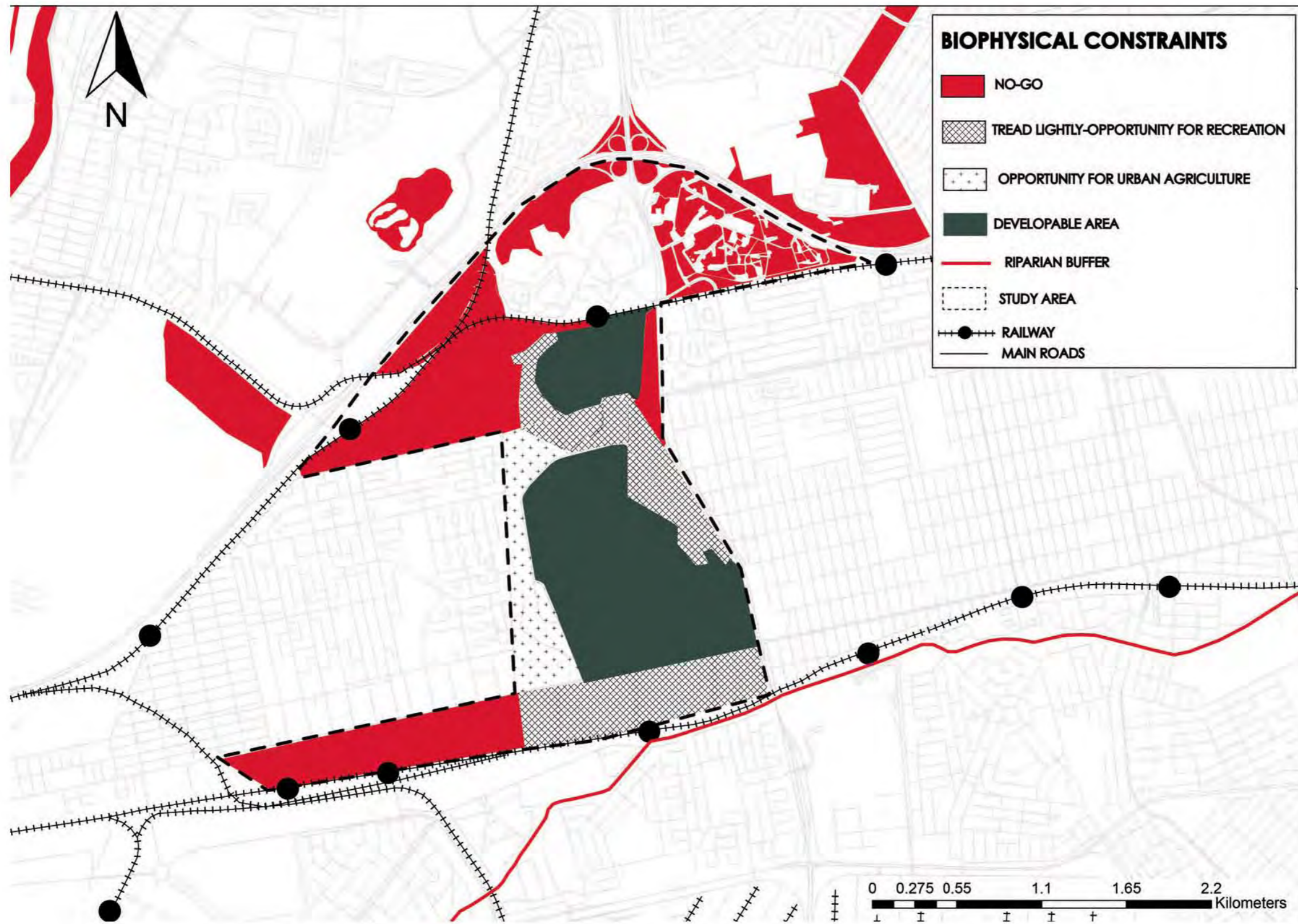


Figure 48: Composite Biophysical Informants (Source:Author; GIS Technical Library, University of Cape Town)

## SOCIAL INFORMANTS

The concern for the evaluation of public facilities and services in the study area is deemed important in terms of the accessibility to these facilities. Accessibility is defined in terms of distances, travel time as well as the capacity of each facility. This section essentially involves recording the sub-regional public facilities and services by type to ensure that the redevelopment of Wingfield works systematically with existing settlement patterns to increase overall convenience. The analysis therefore serves to reinforce existing social facilities. For the purposes of this document, various public facilities and services, which encompass the institutions of learning, health, recreation, exchange and urban space in the study area will be analysed.

### Health

#### CLINICS

Clinics are the first point of entry to access healthcare facilities, as patients are usually referred from clinics to higher order facilities. Thus it is crucial that the study area is adequately served by clinics. It is said that local clinics should thus be accessible to the greatest number of people and be located in close proximity to public transportation routes and interchanges. Furthermore, clinics should be served at a distance of between 2-5km for those travelling by public transportation or 1.5 km walking distance (Western Cape Government, 2010; CSRI, 2010).

### Education

#### SECONDARY SCHOOLS

The age of secondary school learners is between 14 and 18 years old. In addition, secondary school learners account for 8% of the city's population. This percentage along with the maximum capacity of 1000 learners per secondary school is used to establish the demand for schools in the area (CSRI, 2010). In terms of location, secondary schools should ideally be located on a higher order roads and close to public transport routes and interchanges. Furthermore, all secondary school learners should be able to reach secondary schools within a walking distance of 5km (Behrens & Watson, 1996; Western Cape Government, 2010).

#### PRIMARY SCHOOLS

The age of the primary school learners is between 6-13 years old, which accounts for 14% of the total population in the city. This percentage along with the maximum capacity of 800 learners per primary school is used to establish the demand for schools in the area (CSRI, 2010). As in the case of secondary schools primary schools should also be located on a public transport route or in close proximity to a public transport interchange on a higher order road. All learners should be able to reach primary schools within a walking distance of 1.5 km (Western Cape Government, 2010; CSRI, 2010).

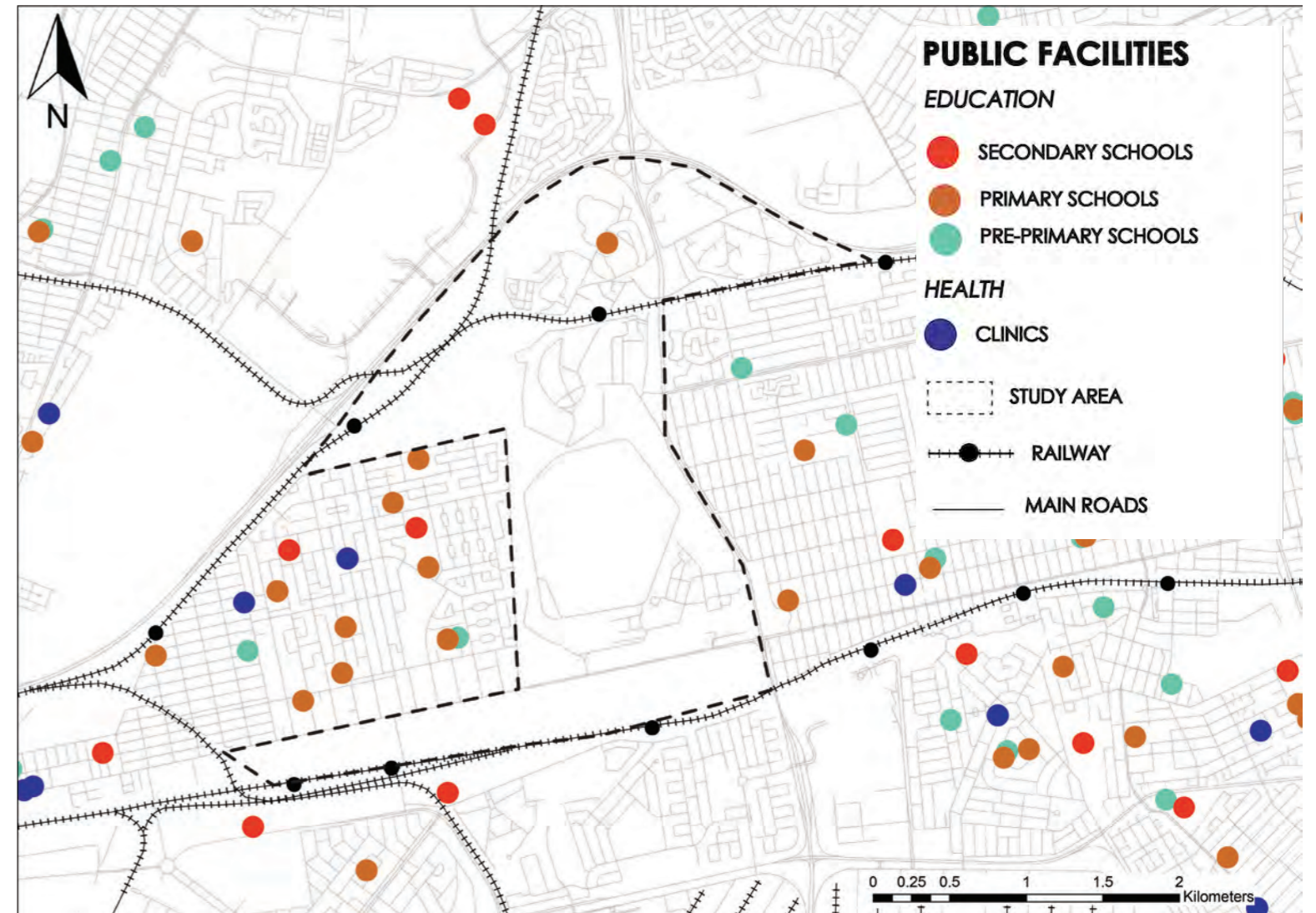


Figure 49: Health and Educational Facilities Analysis (Source: Author; GIS Technical Library, University of Cape Town)

#### PRE-PRIMARY SCHOOLS

These include day-care centres, crèches, nursery schools and aftercare centres and should ideally be located within 0.75 km or 10 minutes walkable distances from its users.

Based on the above parameters, it is evident that the area is serviced by a sufficient number of health and educational facilities.

### Civic Centres

Civic centres are said to be the highest order of community centres and often include public services. The threshold standards for civic centres include one civic centre per 20 000 people (CSRI,2010).

### Community Centres

A community centre or hall is a facility that is used for meetings, gatherings or group activities and relate to the needs and functions of the community, which surround it. A community hall should ideally be centrally located within the neighbourhood and be clustered with supporting facilities. Ideally, community centres should be served within 1.5 km or 20 minute walkable distances. Furthermore, it is noted that community halls are justified where there are between 15 000 and 30 000 people.

### Local Libraries

Local libraries have a service capacity that ranges from 17 500 to 100 000 people (CSIR, 2010). The accessibility for local libraries is a maximum walking distance of 1.5 km.

### PLACES OF WORSHIP

The analysis shows the distribution of places of worship. Based on this, it is clear that there is an adequate distribution of these facilities.

Based on the above requirements of social facilities, it is clear that the study area should be reinforced with social facilities, for example, libraries and community centres currently do not meet the basic threshold requirements in the area.

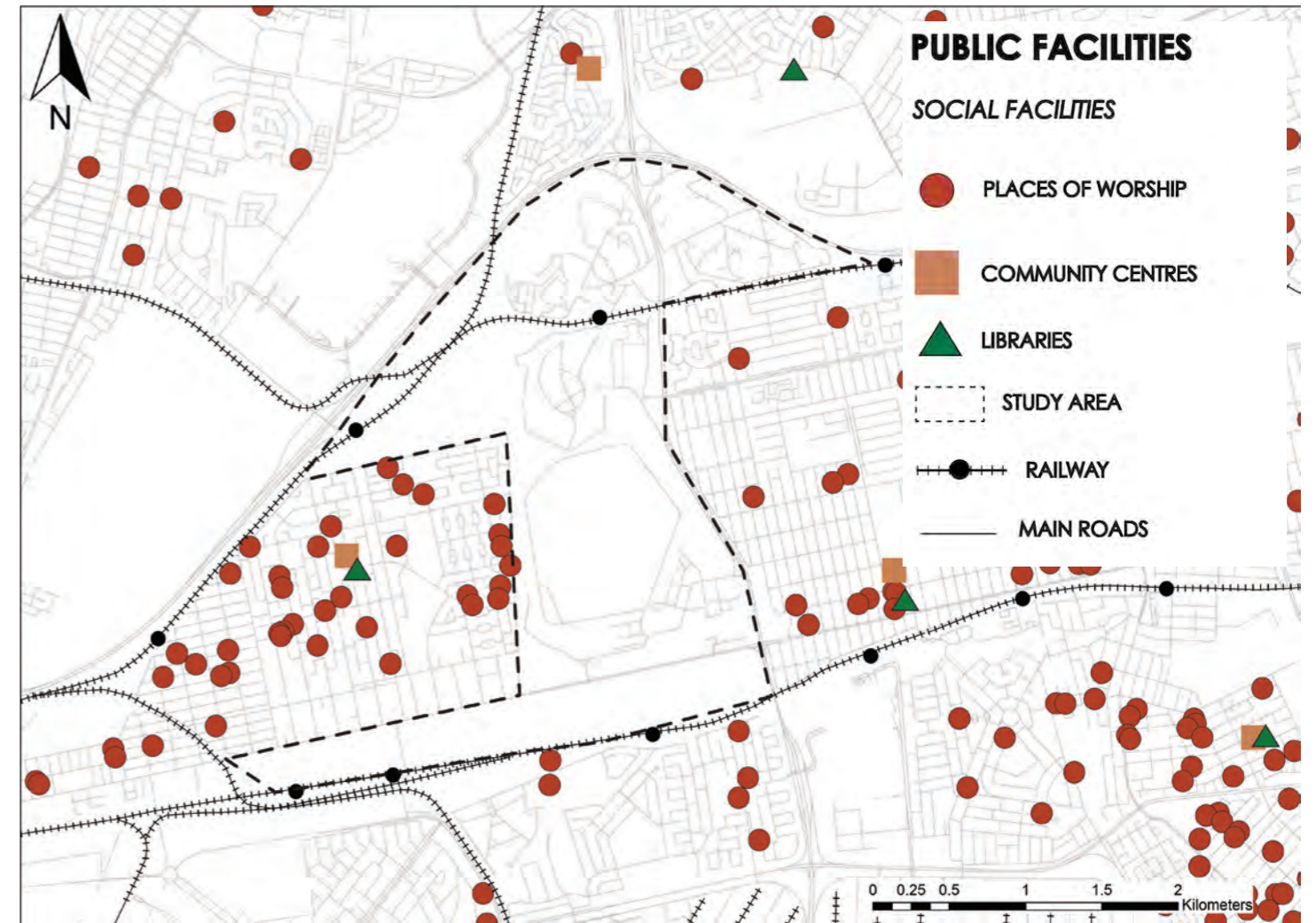


Figure 50: Social Facilities Analysis (Source:Author; GIS Technical Library, University of Cape Town)

## RECREATION

### Active Recreation

#### Sports Fields

Sports fields can be defined as either a formal or an informal recreational area, which is used by the surrounding community for playing sports. It is also used for both school recreation and after hour recreational activity. The current requirement for sports fields is 0.56 hectares per 1000 people. These facilities furthermore, provide excellent opportunities for clustering.

### Passive Recreation

#### District Parks

District parks are usually are large-scale multi-functional parks, which serve the needs of the district or regional community. They are landscaped open spaces that include recreational facilities. District parks should be served within a catchment area of 10km and require a population threshold of 50 000 people (CSRI,2010).

#### Community Parks

Community parks are landscaped open spaces with recreational facilities that serve the needs of several surrounding local communities or suburbs. They may include passive and active recreation areas, small-scale kick-about areas, multi-purpose hard courts and playgrounds. Community parks can also form an important part of an open space network and can be connected by NMT routes or situated in close proximity to a transport interchange. Accessibility to community parks should be served within 1.5-3km for a population threshold of 20000 people (CSRI,2010).

#### Pocket Parks

Pocket parks are defined as a local social recreational spaces which serves the immediate neighbourhood (within walking distance). They often include recreational equipment for children and a kick-about area. Portions of the pocket park may be landscaped with soft and hard landscaping and include benches (Western Cape Government,2010) The design,layout and landscaping of pocket parks is crucial to ensure maximum surveillance and further, they should be located close to medium or high density development that fronts onto the park. This will ensure that the park becomes a safe play and relaxation area for all age groups. Pocket parks should be served within 0.5 km walkable distances for a population threshold of 800 people (CSRI,2010).

Based on this requirement, the analysis of recreational public facilities, depicted in figure 51 shows that the study area should be reinforced with more sports fields and sports complexes. Given that there is also a shortage of open spaces within the study area, the creation of fewer yet larger parks is seen as viable. An analysis of the distribution of community parks, further illustrates that there is opportunity for the inclusion of these facilities as currently they are not adequately spread throughout the study area.

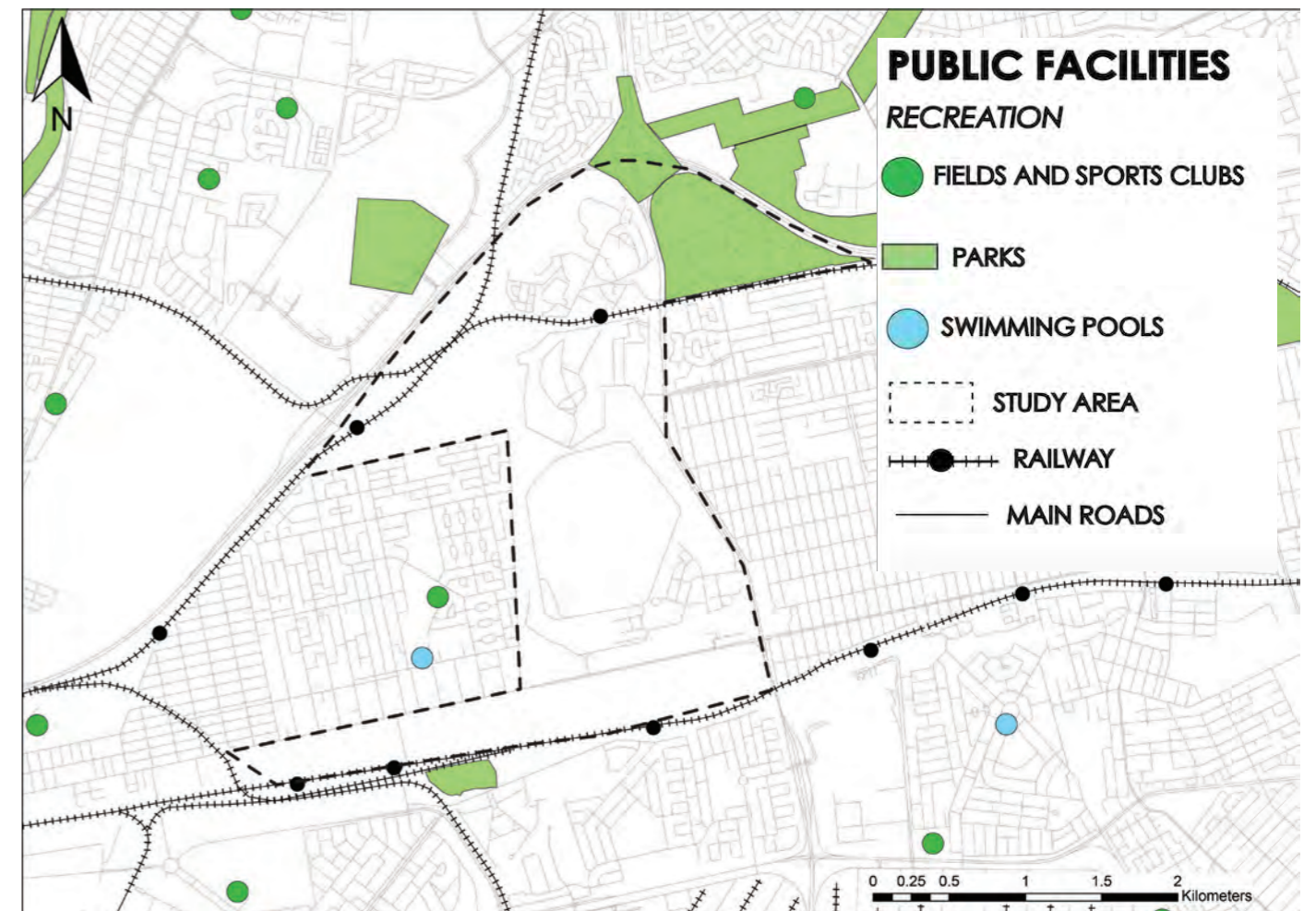


Figure 51: Recreational Facilities  
(Source: Author; GIS Technical Library, University of Cape Town)

## Public Services

### Post Offices

Post offices should ideally be served at 1.2km for its intended users

### Police Stations

It is essential that police stations be central to all the communities it intends to serve. Ideally, police stations should be located at a walkable distance of 1.5 km

### Fire Stations

Fire stations should be located near the intersection of major continuous urban routes (other than freeways or limited access routes) in order to allow for rapid direct access.

Figure 52 shows that most of the above public service facilities are not adequately accessible by the public in terms of walking distances.

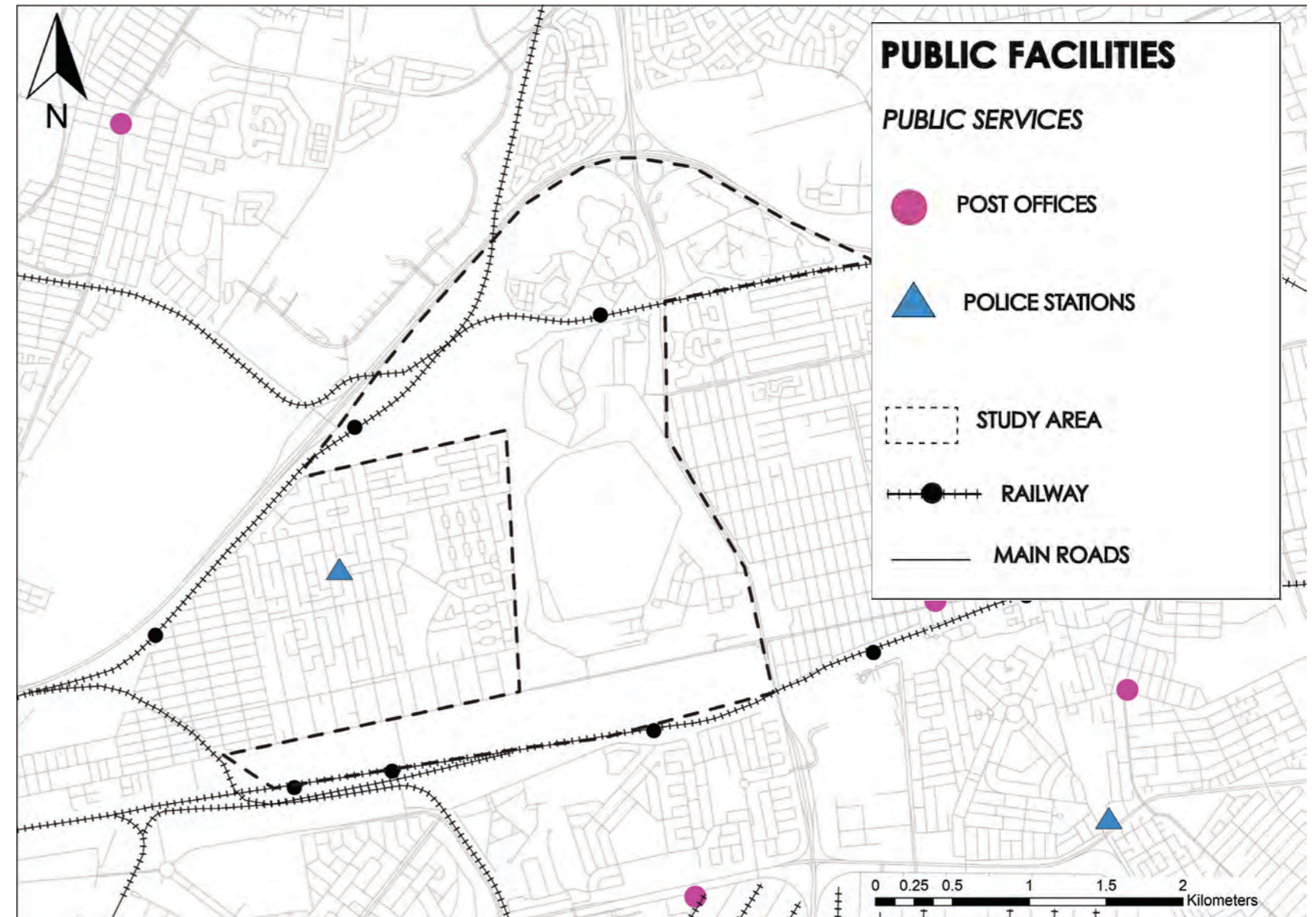


Figure 52: Public Services

(Source: Author; GIS Technical Library, University of Cape Town)

Hierarchy of Public Facilities	
Higher Order	Hospitals Tertiary Education Sports Stadiums
Middle Order	Secondary Schools Adult Learning Centres Clinics Sports Clubs Sports Fields Libraries Municipal Offices Community Centres Post Offices Police Stations Fire Stations Information Centres
Middle/Lower Order	Primary Schools Pocket Parks Community Centres Religious Centres
Lower Order	Pre-Primary Schools
Mobile	Mobile Clinics Mobile Post Offices

Table 2: Hierarchy of Public Facilities (Adapted from Behrens & Watson, 1996).

example, those doing business at traffic robots. The third group use movable displays such as trolleys, baskets, boxes and bags to sell goods. Informal trade comprises 12% of Cape Town's economy and employs 18% of its economically active residents (COCT, 2015). A survey of the informal trading sector in Cape Town which was conducted in 2002 indicated that 42% of traders chose to engage in informal trading as a result of unemployment.

There are a number of informal traders who operate in fixed spaces along Voortrekker Road as well as in close proximity to the major public transport hubs associated with the corridor.

This highlights the significant role that informal trading plays in absorbing the unemployed. Factors which constrain the profitability of informal trade is the accessibility to wholesale markets. Therefore easy movement between retail markets and their major sources of supply and wholesale markets, should always be possible (Dewar & Uytenbogaardt, 1995).



Fixed location traders on Voortrekker Road  
(Source: Author Photograph, 2015)



Light industrial and commercial activity line the Voortrekker Road Corridor

(Source: Author Photograph, 2015)

## Exchange

Exchange and retail activities are prominent features within the study area. These activities are said to display a hierarchy that varies in terms of convenience. To this extent, wholesale activities are concerned with the sale of large quantities at reduced prices and retail activities acquire products from the wholesalers and distribute them directly to consumers. In the context of developing countries, informal trade represents the highest form of convenience and are often located at highly convenient intersections such as public transport interchanges and thrive off major pedestrian flows. In order for informal trade to perform well it should be accessible to wholesale activities and markets, in order for traders to consume these goods. Furthermore, they should be located in areas that are highly accessible to passing pedestrians. The Wingfield site is situated along the Voortrekker Road Corridor, which is lined with commercial, light industrial and other more intensive activities requiring public support (Dewar & Todeschini, 2004). Furthermore, the site is situated in close proximity to Century City and N1 city, which are two major commercial nodes in the vicinity of the study area. Informal traders consists of three categories. The first is comprised of fixed location traders who are permanently located at the roadside stands and transport nodes, such as, bus, taxi and train stations. The second category of informal retailers are those with a fixed or movable base, for



Figure 53: The Supply Relationship of Fresh Produce and Informal Trade (Source: Source: Madevu, 2006)

Figure 53 depicts the supply chain of fresh produce from farmers to informal traders. It is recognized that informal traders prefer to obtain produce from fresh produce markets, rather than farms, as the markets are closer to the locations where they sell. This implies greater convenience and increased profits because of the reduced transportation costs. These smaller satellite markets bring produce closer to smaller businesses and informal traders, therefore reducing costs to them.

## PUBLIC OPEN SPACE

Figure 54 below shows the hard public open spaces within the study area. The provision of public spaces is considered important for social gatherings and activities to occur. The condition of public spaces in the CTMA is often poor and therefore does not contribute to the social needs of those in low income areas. This reinforces the need for the provision of good quality public open spaces.



Figure 54: Public Open Spaces  
(Source: Author; GIS Technical Library, University of Cape Town)

## CHAPTER 8

### THE SITE: RESTRUCTURING AND INTENSIFICATION OF WINGFIELD

The constraints and opportunities maps above, present a number of realities that will serve to inform the way in which intensification of Wingfield will occur. Figure 55 shows the base map information, which will be used for the design phase, at the scale of the site. This base map is the final composite map of all information, which has been gathered in the site and environs analysis. It hones in on the developable area of the site, and the significant green systems, which are integral to the restructuring process.



Figure 55: Base map for the Wingfield Site  
(Source: Author; GIS Technical Library, University of Cape Town)

## THE PURPOSE OF THE DEVELOPMENT PROPOSALS

The development proposals aim to achieve the following developing objectives through good settlement-making design practices. Ultimately, the model informing the development is an intensive, integrated, mixed-use, pedestrian friendly and vibrant urban area that includes a protected and enhanced landscape.

### *Increased Densities and Urban Intensities*

This relates to the creation of a dense and mixed-use urban development which concentrates on metropolitan intergration and intensification around structurally significant places. To this extent, Wingfield is a strategic site as it is both an inner city and corridor-reinforcing site.

### *Urban Sustainability*

The development aims to protect critical biodiversity areas that also form part of the metropolitan biodiversity network. The proposals also serve to establish the pre-requisites needed for ensuring local food and water security through the sensitive and efficient ecological design of urban agriculture. The concepts of water, non-motorized transport and continuities of green space are all central to this.

### *Equity and Integration*

The proposals for the restructuring of Wingfield aim to provide equity of access and socio-economic opportunities for all its residents. This is accommodated through the provision of a full range of movement modes, with priority given to making the settlement pedestrian and bicycle-user friendly, creating the preconditions for a viable and efficient public transportation system. The development proposal also includes internalized public transport provision. The site is also carefully tied into the city-wide movement as well as the blue and green systems. Internally, the movement system is highly permeable and there is also a considerable amount of activity mix, both vertically and horizontally.

Residents of the settlement are therefore provided with greater access to internal socio-economic opportunities and greater and more efficient access to higher order commercial opportunities, such as, the Cape Town CBD, Claremont and Belville.

### *Choice*

The concept promotes a wide range of housing typologies and housing entry levels. It also sets up a range of lifestyle choices ranging along a continuum from very public to very private. To this extent the development will offer dwelling units that consists of different residential typologies, which serve the needs of a range of mixed income groups. However, it should be noted that the development will firstly accommodate low-income households. This is a major justification in terms of the rationale of the redevelopment process and towards achieving social justice. Therefore, preference will be given to groups who were historically disadvantaged and forcibly removed from the site during the 1930s. A concern for choice also has implications for the planning and design of circulation, amenity and utility systems available to end user communities (Behrens & Watson, 1996).

### *Compaction*

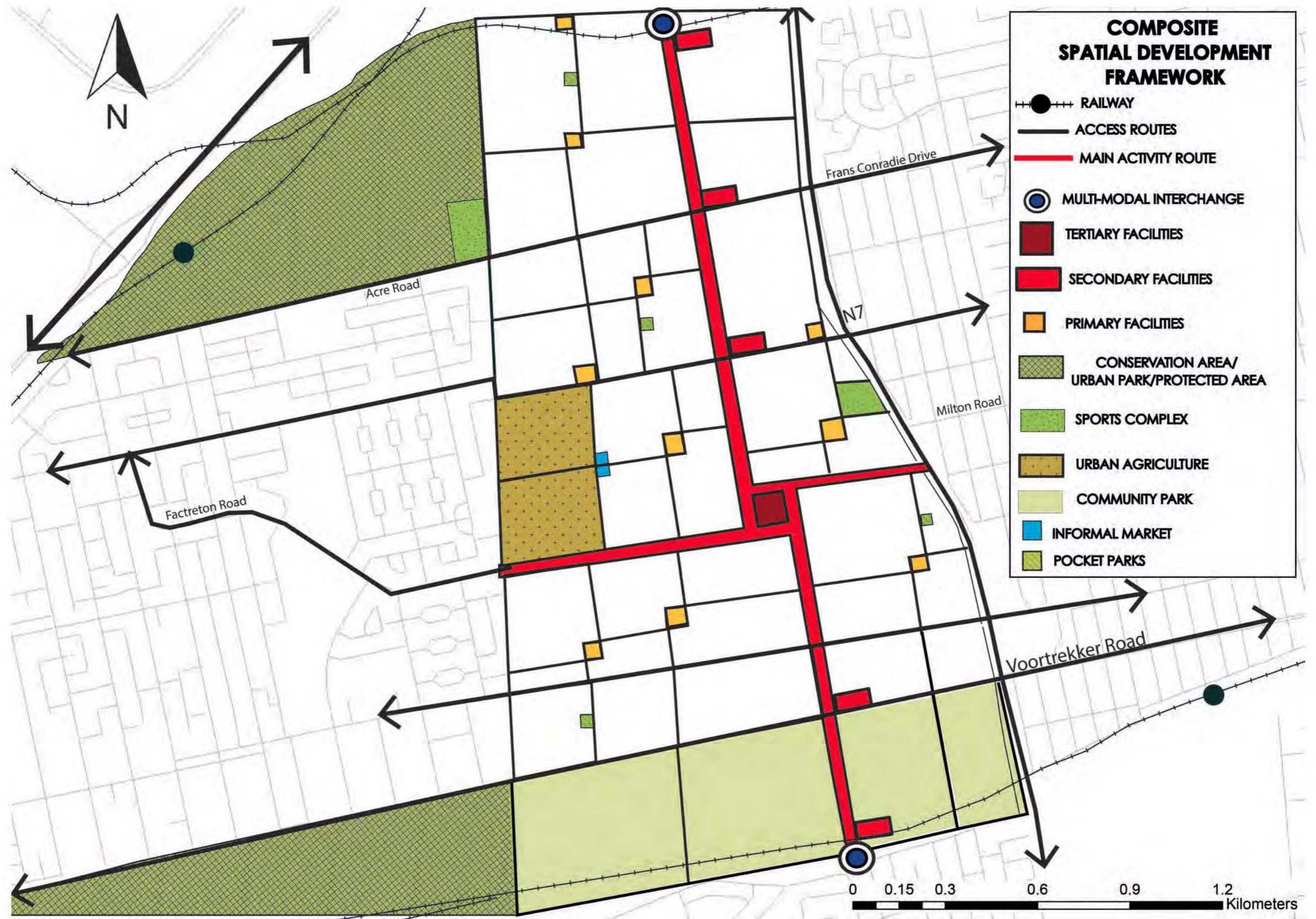
The form of the concept denies sprawl as the settlement has relatively high densities throughout, and the edges are firmly defined and made.

## RESTRUCTURING WINGFIELD: THE CONCEPT

The composite spatial framework for the Wingfield site is presented in figure 56 below. The plan establishes a hierarchy of systems to create the intensity of movement in the study area. This is crucial, as the movement generated will support the conditions for a dense and intense urban environment.

According to Dewar and Uytendogaardt (1995) the degree to which movement dominates space varies from spaces which are exclusively pedestrian, to spaces to those which are entirely vehicular-dominated (freeways). However, it is argued that most spaces should accommodate both pedestrian and vehicular activity. Furthermore, Dewar and Uytendogaardt (1995) find that whilst there are clearly hierarchical dimensions to movement, it is not ideal to adopt a rigid or linear approach. To this extent, some of the best situations occur when the lowest order routes intersect with important continuous routes. This serves to maximize both privacy and convenience, as very quiet living areas are proximate to bustling activity spines. In these cases, the lower order local streets become important social spaces, which must comfortably accommodate pedestrian activities (Dewar & Uytendogaardt, 1995).

In order to maximize accessibility and integration into the Wingfield site, the plan proposes a system of linked pinwheels. Each pinwheel retains its own character, but on the whole, the system presents a wide diversity of activity patterns emerging (Dewar & Uytendogaardt, 1995). Pinwheels are a widely utilized and highly flexible design device, which are used to achieve intergration with the continuity of important routes being consciously interrupted to create special places along its length. This is especially true with regard to higher order spaces where there is a hierarchical correlation between elements of public structure and spaces, for example, higher order gathering spaces are associated with places of high accessibility and attract higher order institutions and facilities. Intersections, gateways, major public facilities, public squares or commercial concentrations help to create identifiable segments with beginnings and endings along these streets. Essentially, this allows for interaction and the sharing of facilities to be attained due to greater permeability of the site.



### COMPOSITE SPATIAL DEVELOPMENT FRAMEWORK

-  RAILWAY
-  ACCESS ROUTES
-  MAIN ACTIVITY ROUTE
-  MULTI-MODAL INTERCHANGE
-  TERTIARY FACILITIES
-  SECONDARY FACILITIES
-  PRIMARY FACILITIES
-  CONSERVATION AREA/  
URBAN PARK/PROTECTED AREA
-  SPORTS COMPLEX
-  URBAN AGRICULTURE
-  COMMUNITY PARK
-  INFORMAL MARKET
-  POCKET PARKS

Figure 56: Composite Spatial Framework for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

The composite spatial framework for the Wingfield site (figure 56), includes the hierarchal public space system, which consists of the various soft and hard spaces that will function as the focal point of community life. Furthermore, The public space system is integrated with the proposed movement system. The higher order activities which seek out the most accessible places attract the highest density forms of development and a wide variety of activities. In the spaces between these corridors, both large and small activities can find a logical place in terms of their prerequisites for exposure or secrecy (Dewar & Uytendogaardt, 1995; Dewar & Todeschini,2004).

The following section will outline the key design and development proposals for Wingfield at the scale of the site based on the composite spatial framework, which will then be unpacked in the subsequent section.

## GREAT URBAN PUBLIC SQUARES

The dominant public square is the central point of community life, and functions as a “great public square” which is surrounded by intensive high-rise and mixed use buildings. In addition, the dominant square serves as the social and institutional heart of the Wingfield development as it houses the highest order or tertiary civic facilities in the proposal. As stated, there is a hierarchal correlation between elements of public structure and space, for example, higher order gathering spaces are associated with places of high accessibility and attract higher order institutions and facilities. In terms of the development proposal for Wingfield, the great central square or civic node is a 100 x100 meter plaza located where the vertical and horizontal activity routes intersect. The square is situated in the most accessible location of site and will be discussed in more detail at the precinct level. This space is enclosed by intensive high-rise mixed-use activities, which include some of the highest order public institutions in the plan. The public square will also accommodate informal activities such as a permanent market, which will stimulate the local economy and add to the vibrancy of the space. The central space is also significant to gather institutions which are shared by everyone.

## THE MOVEMENT HIERARCHY

### Primary Activity Corridor

Figure 56 also depicts the movement system, which is based on two primary activity spines and allows for internal and external integration and accessibility of the site. The vertical activity spine functions as the primary corridor that consists of intensive mixed-use along its entire spine. The vertical spine also promotes the pre-requisites for small-scale economic activity. The horizontal or higher order activity route knits the site into the surrounding urban fabric and essentially creates a horizontal linkage to major commercial nodes in close proximity to the site, namely, Century City and N1 City. These activity spines function as major linear public spaces to promote commercial, social and movement activities, by prioritizing on-street pedestrian movement. For this purpose, the two major activity corridors take on the form of a multi-functional boulevard that promotes the efficient conditions for a viable internal public transportation system. However, for the boulevards to function as a great linear public space, they should be landscaped with colonnaded street frontages to promote convenience and comfort for pedestrian activities. The proposal for Wingfield uses TOD principles by promoting the integration of mixed land-use activities and transportation infrastructure to ensure equal efficient and convenient access to socio-economic opportunities. In terms of the multi-functionality of the primary activity corridor, the best spaces are those made with generosity, and which allow for a variety of activities to occur within them. Moreover, they positively accommodate the needs and comfort of people. These routes should therefore be designed to accommodate multi-functional demands (Dewar & Todeschini,2004).

### Local Activity Routes

These activity routes are defined by the internal superblock, and function as secondary movement integrators, within the site. They provide east-west connector routes as well as north-south secondary activity corridors, which function as linear public spaces and promote conditions for potential intensive activity. These routes essentially connect the lower order public spaces to the primary activity spines as well as secondary external access to the local surrounding areas. Furthermore, the streets accommodate both public transportation and private vehicular access and provide NMT infrastructure to ensure convenient and safe pedestrian movement. This will be complemented by on-street building frontages to ensure community surveillance as well as adequate street lighting for night time activities.

### Great Public Squares



City Hall Square, Copenhagen Denmark  
(Source: <http://i.usatoday.net>)

The City Hall Square is a public square situated in central Copenhagen, Denmark. Its large size, centrality and affiliation with the Copenhagen City Hall makes it a popular public venue for a variety of events, celebrations and demonstrations.

TOD



Portland, USA  
(Source: <http://fieldnotes.norr.com>)

Great Boulevards



Market Street, San Francisco  
(Source: (<http://mobilitylab.org>))



Ontario, Canada  
(Source: <http://smartgrowth.org>)

Market Street, San Francisco is an example of a multi-functional boulevard that provides NMT, pedestrian-friendly walkways and accomodates both public and private transport.

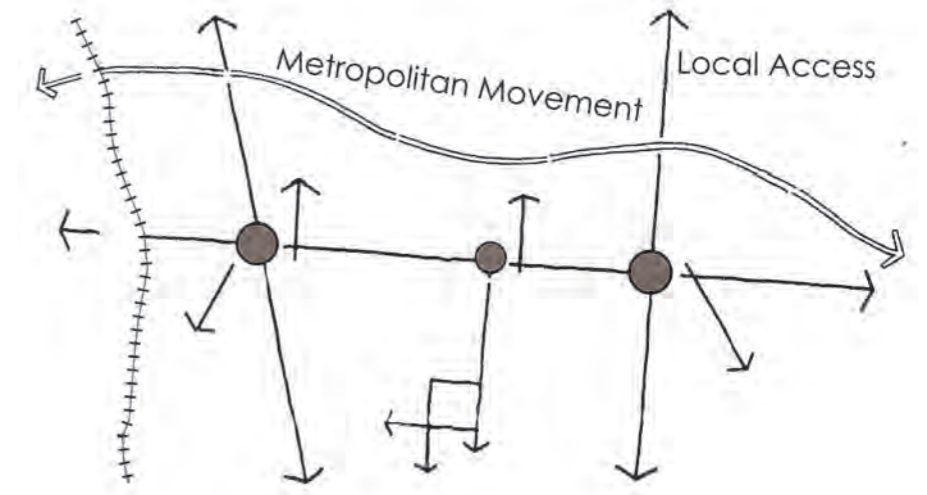


Figure 57: A diagram showing the way in which the hierarchy of access will intergrate the site with the surrounding fabric  
(Source: Adapted from Dewar & Louw, 2013)

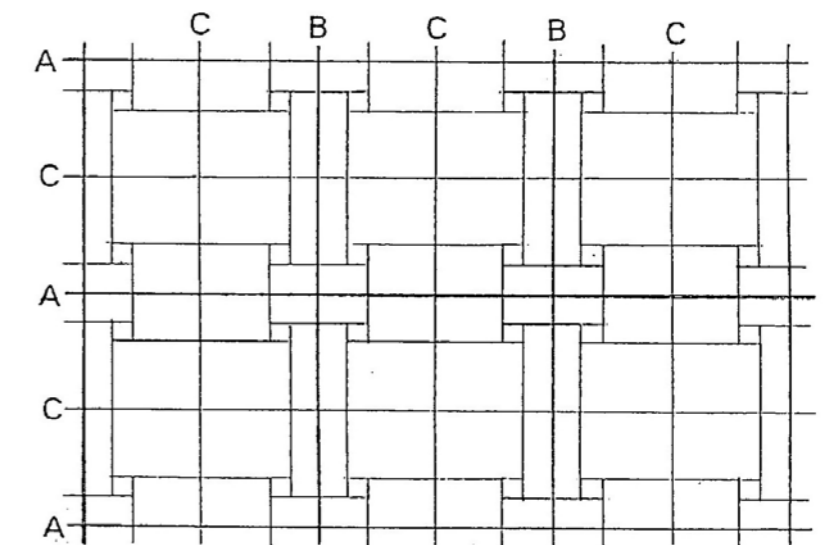


Figure 58: A diagram showing the way in which hierarchal differentiation can occur within settlements.  
(Source: Dewar & Todeschini, 2004)

The grid is one of the oldest design devices used in "Non-Programmatic" plans. The grid can yield numerous levels of structural order and opportunity through hierarchical differentiation. In the above diagram the letters represent the hierarchical levels of accessibility, with A being the highest order (Dewar & Todeschini, 2004)

The following sections will explain how the design of the different elements will assist in achieving the above conditions.

## THE WINGFIELD CONCEPT UNPACKED

- Green Space: Urban agriculture, environmental conservation and utility services.
- Movement of all Modes: The movement network, public transportation and NMT.
- Public Institutions (Exchange,Work,Recreation,Health and Learning)
- Urban Public Space (Soft and Hard open spaces)
- Indicative Land Use
- Height Policy
- Densities
- Identification of a precinct Area.

## GREEN SPACE

The sensitive ecological nature of the site suggests that the proposed development should include a strong green concept. The biophysical informants revealed by the site and environs study, indicated that the significant wetlands and critical biodiversity areas of metropolitan significance are situated in western portion of the site. Therefore, because of the flat and wet nature of the site, run-off management should provide the first level of urban structure. Furthermore, continuities of green space should be retained.

The concept for the study area begins by designating green spaces as the structuring system for the intensification of development. The conservation area situated in the top western portion of the site will function as a city-wide or district urban park that includes a major water retention system or dam. The proposed city-wide or urban park has a multi-functional purpose as it serves both ecological preservation of critical biodiversity areas, utility efficiency and flood prevention. This multi-functionality extends to passive and active recreational activities, for example, walking trails and bird hides which are situated on the edges of the dam. Furthermore, the proposed urban park will include active recreational facilities such as a sports complex that comprises of sports facilities and a club house.

Due to the flat terrain of the site, the land will also have to be corrugated to allow for sufficient drainage conditions, to enable controlled run-off. To this extent the design proposes an internal ecological corridor. As the site naturally drains from north to south, the proposed intervention enables drainage to occur from east to west, which then drains in a southerly direction via the proposed ecological corridor. The ecological corridor thus functions as a linear spine that extends the protected conservation area of the site to the sports field and agricultural areas. In this way the ecological corridor allows for storm water and partially treated wastewater to be channeled onto playing fields and urban agricultural areas in order to irrigate and fertilize these (Dewar & Uytendogaardt, 1995). The rationale of the proposed concept for the Green Space of the Wingfield site, is reinforced by Gaston (2010) who states that greenways are networks of land containing linear elements, which have multiple purposes such as ecological, recreational, cultural and aesthetic purposes.

Gaston (2010) adds that these multi-purpose greenways also address the need for flood attenuation, water quality and education. Similarly Dewar and Uytendogaardt (1991) state that the wetlands or water retention systems can become important supplementary sources of recreation and irrigation. The water retention system thus functions as a water feature, which adds to the scenic beauty of the development, providing amenity as well as ensuring local water

security through the recycling of grey storm water drainage. The proposed Urban agriculture could include vegetable and food lots, which inevitably means that the land is not only a potentially valuable economic resource but also a supplementary source of nutrition and income and food security.

*Grorud Park, Oslo Norway*

Grorud Park is one of four new neighbourhood parks in Groruddalen. The park includes facilities for sport and recreation as well as social interaction and cultural activities, in order to provide for the diverse local population. Critical to the design process were issues relating to flood mitigation, stormwater management and cleansing of polluted runoff and water quality. The improvement in water quality has resulted in soil cleansing techniques which deal with soil pollutants that are bound to vegetation, and furthermore reduce carbon emissions associated with transport through on-site soil remediation. Furthermore, storm water from surrounding areas is cleaned within the bioremediation ponds, before being released into the major rivers. The project therefore has great ecological significance in improving water quality.



*Grorud Park, Oslo Norway*

(Source: <http://worldlandscapearchitect.com>)

*Stockholm, Sweden*

Stockholm has used planning to create a more sustainable society. The planning system is based on the idea of “community planning” which is concerned with the formulation of strategies to improve the quality of life for Swedish citizens as well as the quality of the natural environment. Planning and environmental policies therefore focus on the dual purpose of urban development patterns and green space preservation through, the creation of guidelines and policies that ensure humans are close to nature and that natural areas maintain their ecological functions. A major feature of the plan is regional green wedges that create both human enjoyment and help to maintain the natural biodiversity of an area.



*Stockholm Strategic Plan (Source: Nelson,2012)*



Source: <http://ripplecg.com>



Figure 59: Green Space Concept for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

## PUBLIC TRANSPORTATION AND NMT

This section aims to provide a concept showing the integrated public transport system for Wingfield. The system allows for private vehicular movement; rail; a local bus which operates on a fixed pathway and which stops more frequently and a BRT system. The concept also includes a tram line that functions as the main distributor throughout the site. The transit interchanges proposed in the northern and southern portions of the site accommodate a change in mode and direction. The dense urban fabric of the development provides the pre-conditions for an efficient public transport system.

The figure 60 presents a plan showing the two proposed public transportation modes that operate within the context of the site. The system as a whole functions as a closed-loop system where two modes operate in an integrated manner to reinforce and complement each other.

Firstly, the tram line operates along the vertical activity spine in a north-south direction creating a dynamic linkage between the two major transport interchanges and the various public spaces and facilities located along the spine. The tram system thus operates as a trunk route and is supported by the BRT and NMT networks.

The second public transport mode includes an internal bus system, which operates in various loops that links to the primary economic and public facilities along the vertical activity spine. This is also based on local travel and is essentially aimed at taking people to the transit interchanges.

The BRT system operates within the activity routes to improve accessibility throughout the site, by providing flexible and efficient public transportation in all directions. The BRT system intends to promote north-south linkages between the study area and the economic activities in the north and to increase the efficiency of the rail system by joining fragmented sections of the railway. Therefore the BRT system is an extension of the rail system and runs in freeways in order to close the gaps.

For the system as a whole to work efficiently, integration between different modes of transportation (from rail to BRT or BRT to local bus and tram) must be convenient for the user. This would require investment in multi-modal interchanges at key locations. The greater foot traffic experienced by these interchanges are also conducive to retail activity, both formal and informal. This serves to make the integrated

public transportation proposal viable.

The tram stops are located at every 200 meters while the bus stops are located at 800 meter intervals, in order to conform to acceptable walking distances between collection points. The system also integrates the transport interchanges with the proposed NMT network linking the various public spaces and public facilities throughout the site. This essentially allows for convenient pedestrian access to the public transportation system as well as various activities within the settlement.

### Tram Systems



Toronto Streetcar, Canada  
Source: <http://transit.toronto.on.ca>

The Toronto tram system is the largest streetcar system in North America. It does not operate on its own lane, and is therefore integrated within the street grid.

### BRT Systems



Curitiba, Brazil  
Source: <http://www.aimsun.com>



(Source: <http://i2.wp.com/thisbigcity.net>)

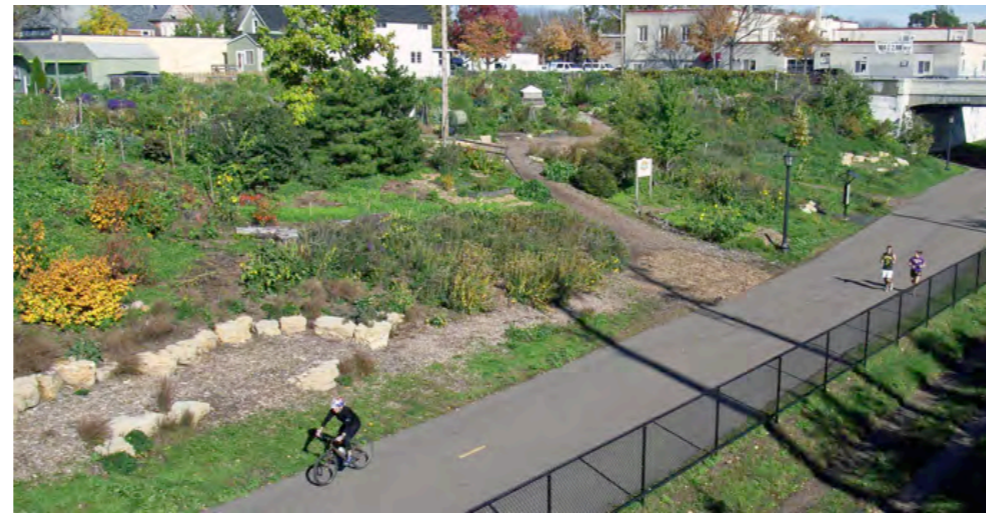
Curitiba, Brazil

The BRT system in Curitiba was implemented in 1974, and the first of its kind. It sets a leading example and precedent as an integrated transportation system in the developing world context.



*Bologna, Italy*  
(Source: Eco Mobility,2014)

Bologna, Italy is a city fit for pedestrians and bicyclists. Pedestrians in Bologna have 45km of covered streets which create a pleasant environment who wish to avoid the sun and rain. The city also promotes bicycles as an alternative to cars. To this extent, the city has created 128 km of safe well recognized bike paths along 14 different routes (Eco Mobility,2014).



*Grand Rounds National Scenic Byway,*  
*Minnesota,USA*  
(Source: <https://morriscanajc.files.wordpress.com>)

Grand Rounds National Scenic Byway is an example of an urban greenway in Minneapolis which stretches alongside the Mississippi River, wetlands parks and gardens to name a few. The trails are managed and maintained for different uses that include biking, walking, and roller blading.

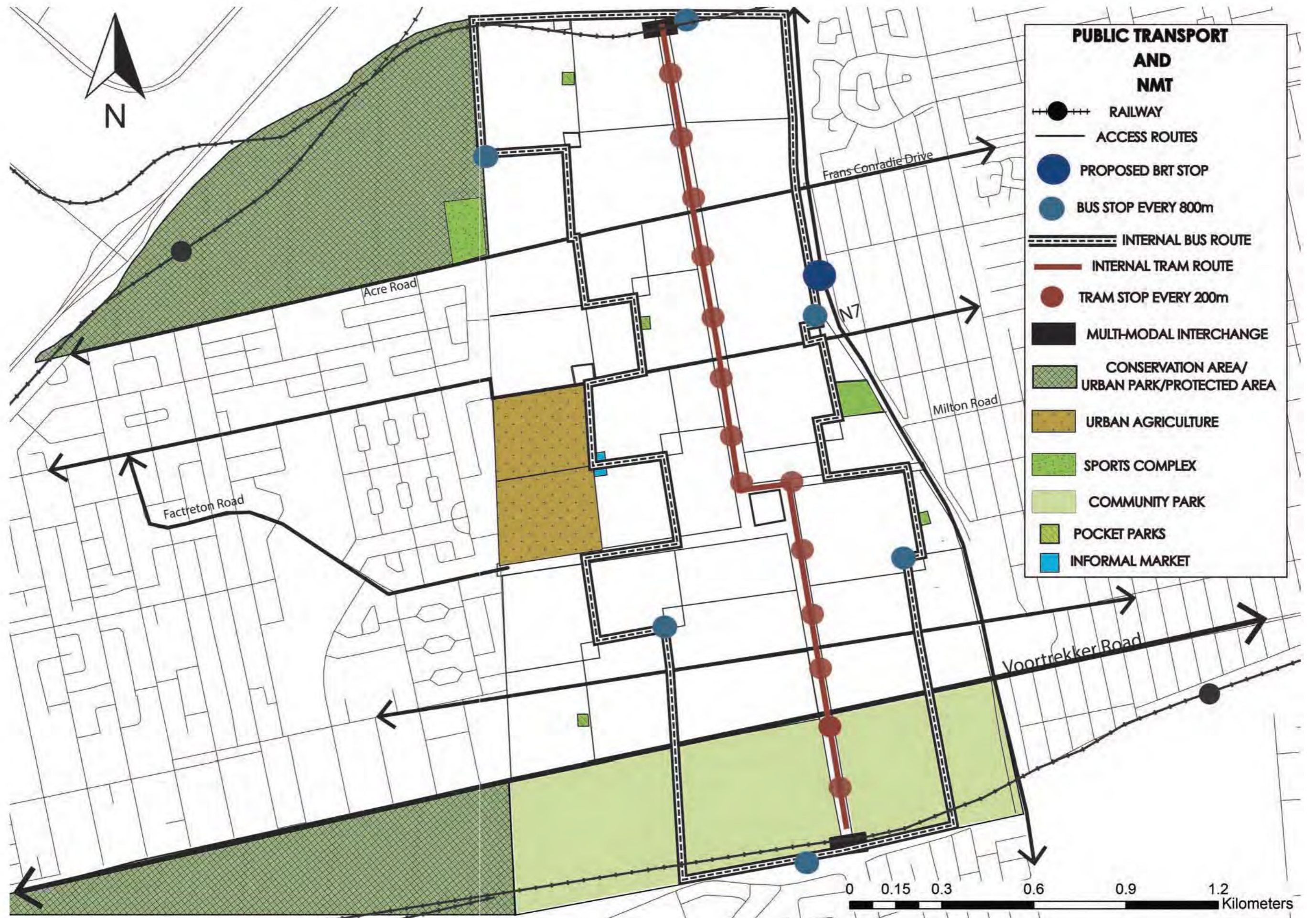


Figure 60: Public Transportation and NMT Concept for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

## URBAN PUBLIC SPACE

In the same way that it is possible to create a hierarchy of movement it is also possible to create an associated hierarchy of public spaces. Dewar (forthcoming) argues that all public spaces are multi-functional and serve to accommodate all kinds of activities. When these spaces are properly made they enhance the enjoyment of the activities that they accommodate, whilst impacting positively on the dignity of the entire environment. In positive environments these spaces operate as social spaces and constitute the gathering or meeting places within settlements. This is particularly significant in the lives of the urban poor, as many of these households are unable to accommodate a full range of daily activities within private space. To this extent, public spaces operate as extensions in the form of "collective public living rooms" of private dwellings, especially in the context of overcrowded housing units. The primary role of the building in this conception is therefore to define the public space.

Behrens and Watson (1996:67) support this notion by stating that "a hierarchal system of public spaces should form the main organizing structure of urban settlements as opposed to vehicular movement channels dictating settlement structure". Figure 61 shows the placement of the urban public space for Wingfield. These public spaces were strategically allocated within the 300x300m superblocks and in accordance with the two primary activity spines, which are 30m each.

Furthermore, the allocation of public spaces was done in accordance with the hierarchical classification. The hierarchy of hard public spaces corresponds with the movement system. The largest and most important hard spaces are therefore located at points of maximum accessibility, for example, at the intersections of more intensive movement routes and public transport mode interchanges. Furthermore, these areas provide potential for where commercial activity and intensive informal trade. Smaller hard spaces are located where collective services are situated and provide opportunities for less informal trading.

Tertiary public spaces are located at the major intersections of the primary activity routes. The secondary public spaces are located along the higher order roads and the primary public spaces are located at the intersections of lower order streets. The two major activity spines are located in accordance with the major existing structural opportunities surrounding the site. The vertical spine, therefore, links the two transit stations

located within the site and the horizontal spine is an extension of Factreton Road on the West and Milton Road to the East creating a potential linkage between Century City and N1 city.

Soft spaces such as the urban agriculture areas and dedicated sports complexes are strategically located adjacent to the protected area and close to the major routes. The sports complexes are based on the maximum degree of sharing by schools and clubs and are thus space extensive. The concept proposes two major sports complexes, which comprises of sports facilities and a clubhouse and which are strategically located on the edge of the settlement or in peripheral areas to prevent discontinuity of the urban fabric. The smaller (120 x 120 meter) sports complex takes a central position on the edge of the site to allow for greater city-wide access to the facilities as well as local accessibility from surrounding communities. Furthermore, an informal agricultural market or farmers market is located adjacent to the agricultural areas. Local soft open spaces such as smaller pocket parks are located at the corners of superblocks.

In terms of exchange a system of markets occurs in the public spaces. Markets are located at points of maximum accessibility as they seek a close association with public transport and major pedestrian flows. Therefore, the smaller the market the greater the immediacy required in relation to pedestrian movement (Dewar & Uytendogaardt, 1995).

The proposed public space system consists of different types of public space according to their hierarchy and nature of the facilities they serve.

### Tertiary Facilities Courts

#### *Civic Building Forecourt*

Access to facilities such as public services and civic buildings are an important function of hard open space. These spaces also allow for the establishment of a permanent market and are significant social or gathering spaces that should also include benches or terraces to encourage moments of rest for passers-by. As the highest order facilities within the settlement, these spaces are considered to be the "civic heart" of the urban environment. Elevation from the ground plane may therefore be beneficial to signify their importance. To this extent a vehicular bridge is proposed which leads to the civic building square.

#### *Transport Interchange/ Station Forecourt*

The public open space associated with the transport interchanges are especially conducive to informal trade due to high levels of passing foot traffic. This is reinforced by Dewar and Uytendogaardt

(1995) who state that markets should be associated with public transportation terminals, such as railway stations, bus and taxi ranks. Such spaces therefore require areas of canopies where traders can cluster under, achieved by the use of trees. Because they generate large flows of people, interchanges should also be associated with a pleasant landscaped public space, operating as the informal market.

The centrality of the market presents an ideal opportunity for public services to be associated with these points as this serves to reinforce the market function. The design of the public space must therefore provide infrastructure to be used by informal traders such as lock up and go facilities and the relevant sanitation facilities. At the city scale there is also an important relationship between retail market systems and major sources of supply such as wholesale markets. Investment in NMT infrastructure that links public transportation interchanges to the farming areas must occur to ensure a well-performing supply-chain between farmers and traders. This is especially significant for the fresh produce markets who will need to have good access to the wholesale markets or direct suppliers from farms (Behrens & Watson, 1996)

#### *Market Square*

Public squares also represent dynamic open spaces that can be used for periodic markets at certain times of the day, week or year. Thus these spaces are flexible as they can change from weekend markets to festivals and the temporary use of parking.

## SECONDARY AND PRIMARY FACILITIES COURTS

These spaces serve as the entrance to secondary and primary facility clusters, for example, the school forecourt is an area where learners can gather before the beginning of classes. This is important for safety reasons as it implies that they do not congregate in the roadway. The clustering of secondary facilities also allows for the forecourt to symbolize the entrance to the secondary and primary public facilities. These spaces could also accommodate mobile facilities such as mobile clinics and post offices.

### *Informal Light-industrial use*

These types of hard public open space comprises of a workshop type public space for light industrial goods. Behrens and Watson (1996) state that collective service points and utilities should be clustered around public markets and hard open spaces in order to create favourable small-scale manufacturing and trading conditions. As these services are also dependent on the passing foot traffic, they will need to be developed in proximity to transportation hubs and in location of light industrial uses.

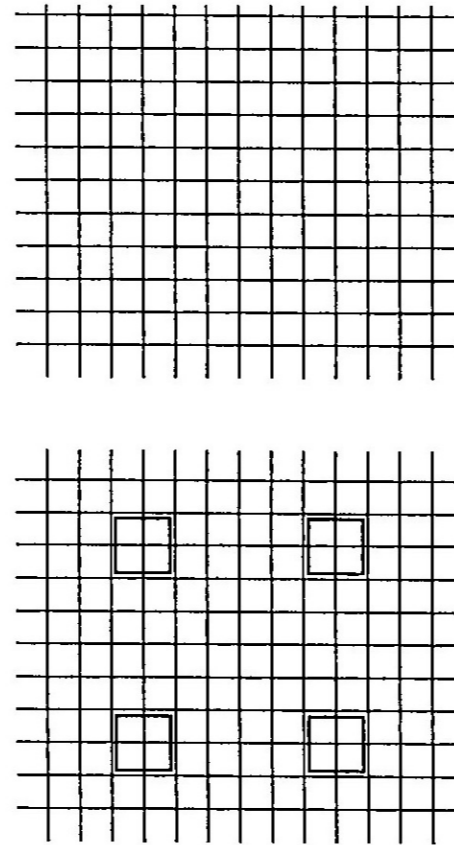


Figure 61: The Grid Associated with public Space  
(Source: Dewar & Todeschini, 2004)

The diagram above depicts the “system differentiated” by showing the way in which every activity consists of its own logical requirements in terms of access. It is said that at the most fundamental level, these logical requirements relate to variations in the need for publicness (exposure) or privacy (secrecy). The more complex the accessibility surface, the greater the range of choices offered.

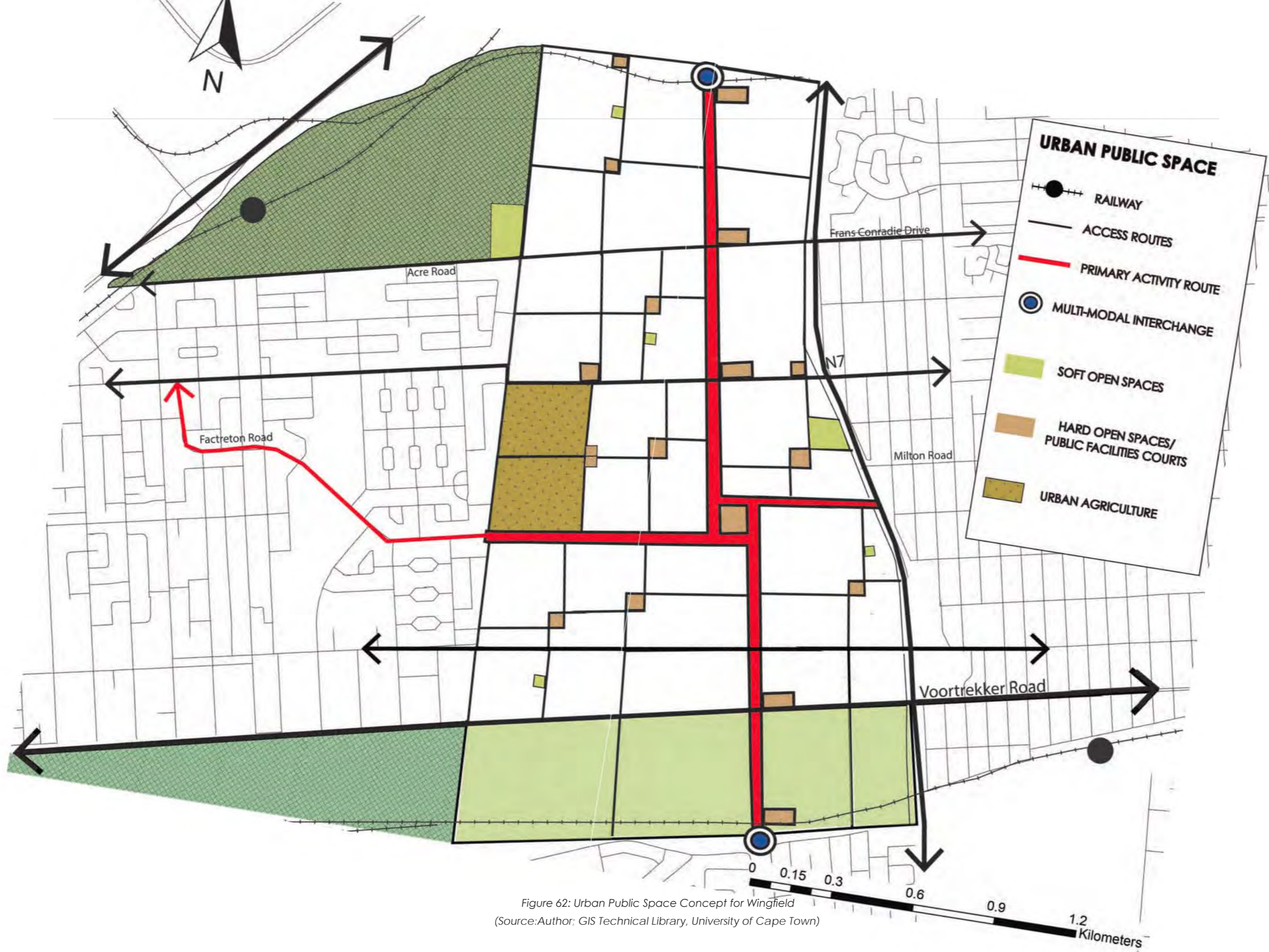


Figure 62: Urban Public Space Concept for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

Figure 64 shows the public facilities clusters for the proposed Wingfield Site. It should be noted that after the placement of urban public space, each hierarchal class accommodates a different order of public facilities clusters. Behrens and Watson (1996) reiterate this by stating that the structuring elements of urban settlements are public institutions and facilities and the public spaces are the main mechanisms for the gathering and ordering of these. The makeup of the cluster will therefore in terms of the hierarchal level of accessibility associated with the point.

To this extent, the tertiary facilities clusters accommodate higher order civic institutions, secondary public facilities clusters accommodate lower order institutions such as secondary schools, day hospitals, sports clubs, sports fields, libraries, community centres and places of worship. Secondary public facilities also include public services such as post offices. The primary public facilities clusters accommodate low order institutions and facilities, for example, pre-primary schools, crèches, primary schools and clinics. Lower order facilities include pocket parks and forecourt spaces such as the informal agricultural market. The public facilities hierarchy is presented in Table ( ) below. The allocation of the public facilities hierarchy stems from the fact that different order institutions require different levels of exposure in order to fulfil their different threshold requirements. Higher order public facilities are clustered around highly accessible public transport stops adjacent to major road intersections. Lower order, which include secondary and primary facilities are located at lower order road intersections along public transport routes. The exposure of facilities enables complex patterns of facilities use between different neighbourhoods to occur and serves to integrate rather than isolate residential neighbourhoods (Behrens & Watson, 1996). The purpose of the designated urban agricultural area in the western portion of the site is to ensure sustainable local food security and livelihoods. The produce can either be utilised as subsistence or can be sold as a means of income at the informal agricultural or farmers market. The urban agricultural land is strategically embedded into the urban fabric to allow the potential of an urban agricultural village to emerge in the urban area surrounding the agricultural land.

Dewar & Uytendogaardt (1991) state that each element of the hierarchal system should be seen as a resource for lower order elements of the system and should be strategically located to provide easy access to the necessary support services for these lower levels. This allows for the optimal use

of available resources. The clustering of facilities results in a more efficient use of utilities and services as convenience is increased for the user and many tasks can be accomplished in a single trip. This also results in reduced time and costs associated with long distance travel. Multipurpose facilities are also less likely to fall into disorder as it makes the implementation of a management body and a maintenance plan more feasible. The various types of activities offered allows for activity to occur at all times of the day, which serves to increase the perception of safety and encourages "eyes on the street".

Cato Crest Multi Purpose Centre, Cato Manor



Source: <http://www.cmda.org.za>

The Cato Manor Development Programme:

The Cato Crest Multi-Purpose Centre illustrates the example of the concept of clustering. Primary and secondary educational facilities have been combined with a community hall, public library and sports field to create an integrated and highly cost effective complex. To this extent the Cato Manor social infrastructure programme aims to ensure that residents on Cato Manor are provided with a range of social facilities in a co-ordinated manner. Furthermore, social facilities are designed around key principles to ensure that they offer safe and convenient access by users and are affordable, sustainable and promote economic development.

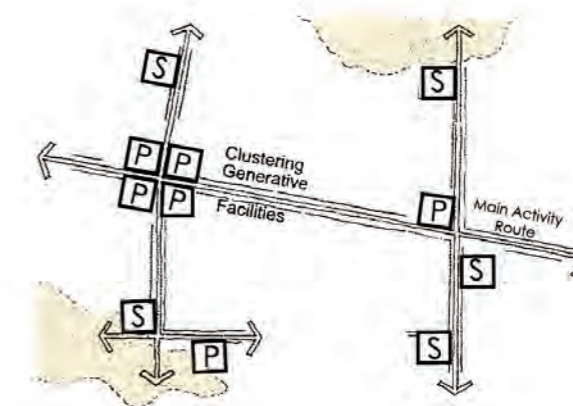


Figure 63: Diagram showing the relationship between higher order tertiary and secondary facilities (Source: Adapted by Author from Dewar & Louw, 2013)

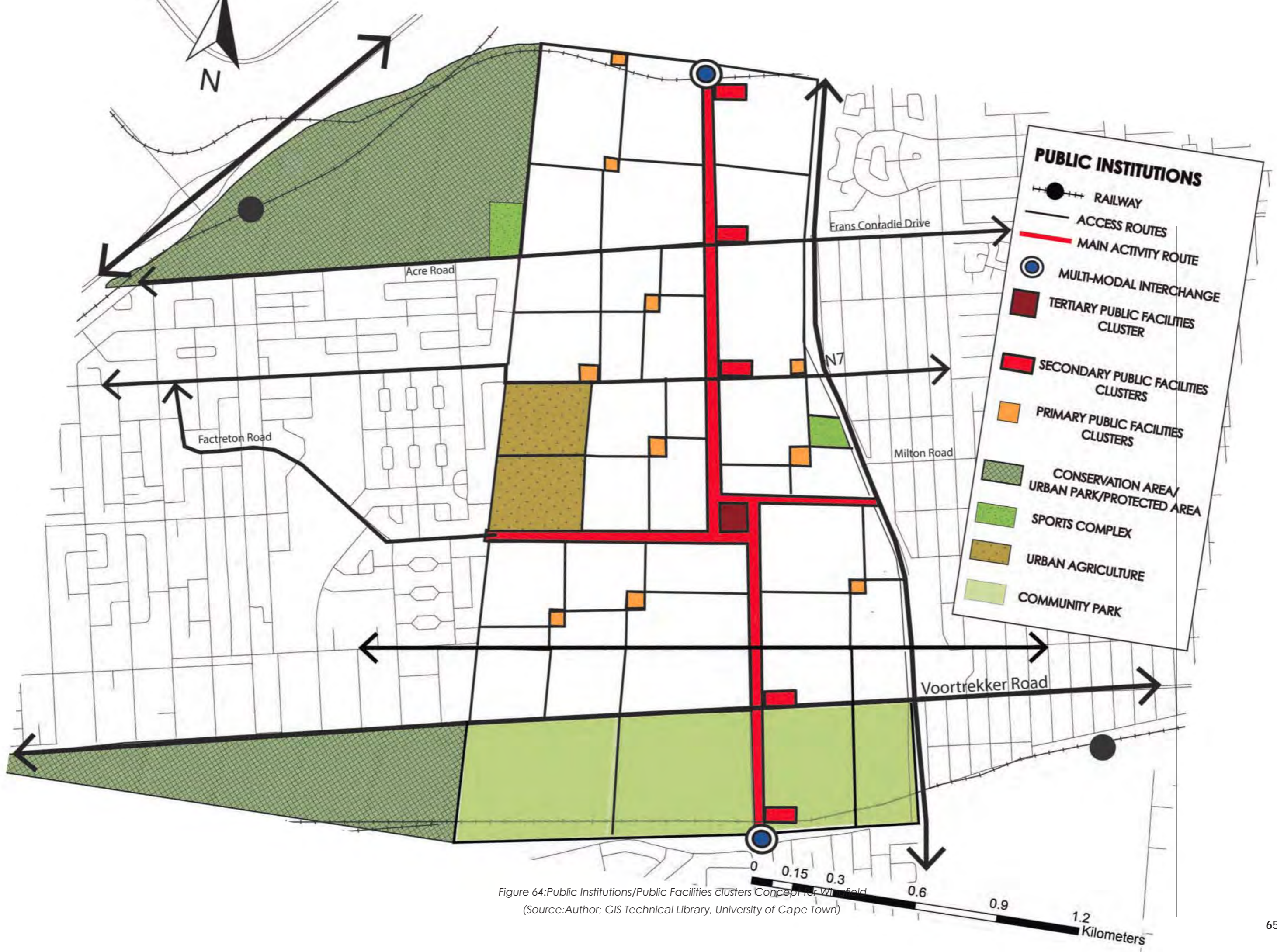


Figure 64:Public Institutions/Public Facilities clusters Concept for Winfield  
 (Source:Author; GIS Technical Library, University of Cape Town)

## INDICATIVE LAND USE

This section presents framework, which establishes broad land use indications for Wingfield. To this extent the land-use framework aims to establish the most applicable land-uses that respond to the movement generated by clustering public facilities together. The mixed land-use allocation is interpreted together with the densities and height policy (See figure 66 and 67).

### *Mixed Public Facilities Clusters*

These land uses consist of clusters of public institutions that encompass public spaces. Furthermore, the mixed institutional clusters range from higher order or tertiary, to secondary and primary facilities clusters.

### *Mixed Commercial*

The primary vertical and horizontal activity spines consist of intensive mixed commercial activities. These activities include retail or formal shops, offices, small-scale enterprises and residential activities.

### *Light Industrial*

This includes Industrial use that does not include noxious emissions. The intention of the light industrial use is to promote the growth of small-scale businesses, home industries and small-scale manufacturing. Light use industrial is proposed and occurs in mixed-use bands off the major commercial or activity spines. Light industrial activities include workshops, warehousing and manufacturing.

### *Mixed Use Development*

This zone includes housing and commercial or industrial activity. The mixed-use zone essentially requires that residential use is included to ensure that the area is populated at all times of the day. Retail activity will occur on the ground floor, which allows for the development of small businesses. The floors above generally include residential use, with some commercial activity, as small-scale working from home commercial activity is permissible. The relationship between informal trade and formal retail activity is often mutually beneficial as they provide the consumer with a variety of options. Informal trade also requires high pedestrian foot traffic to be successful, and

thus their location around public transport interchanges is important.

### *Hard Public Open Space*

The primary uses for these spaces include the public transport interchanges and informal trading (markets). The provision of hard open space plays a crucial role within the broad land-use areas as the facilities and activities that surround the public space will essentially determine how it will be used. When public open spaces are located around retail and mixed-use activities they become a prime space for informal economic activity. This may also include other forms of small scale self-sustaining activity.

### *Residential*

The residential land-use will fulfill a mix of housing needs through the inclusion of a variety of housing typologies. This includes the provision of land, which is prepared for informal housing. To this extent social rental housing serves to accommodate households who are earning between R2500-R7500 per month. This includes those who are unable to meet the requirements for the private housing market (households earning an income of approximately R15000 per month) as well as those who do not qualify for a government subsidy (households earning an income less than R3500). It is crucial to cater for a variety of income groups in order to not exclude anyone from the residential market and to create choice and diversity within the area.

The residential types also require good quality public space and are therefore associated with the parks and other soft open spaces. The placement of housing adjacent to the mixed-use zones will also provide adequate densities to support the use of public transportation. Furthermore, the strategic placement of high-density housing means that the land corresponds to the NMT routes and recreational spaces. Higher density housing includes vertical expansion in excess of 4-storey walk up forms. Residing therefore offers a choice in terms of lifestyle, ranging from public to private and housing typologies. Informal Housing is strategically located next to the urban agricultural areas and farmers market presenting the opportunity for live-farm units.

### *Recreation*

Active recreation consists of a sports complex that includes a clubhouse and a collection of indoor and outdoor sports facilities, such as, sports fields. Passive recreation consists of parks that include a major District Park, Community Park and various pocket parks. It also includes a landscaped NMT route that links to the public transport interchanges. Although the NMT routes allow for cars, it ensures

pedestrian priority. Furthermore, these areas contribute to the management of storm water control in the area.

### *Conservation and Agriculture*

The western portion of the Wingfield site is a critical biodiversity area and as such the area serves citywide ecological significance. As stated, this area is significant in terms of sustainable urban drainage and flood attenuation and is a source of local water security. The intention of the agricultural zone is to contribute towards food security of the city whilst simultaneously creating sustainable livelihoods for those who subsist off the land.

## Social Housing Precedent

This section summarizes two recent, successful examples of high quality social housing in Cape Town, as a basis for some of the housing developments on the Wingfield site. Social Housing generally refers to rental stock, which is made available to households earning between R2500 and R7500 per month. This type of housing plays an increasingly important role, as it helps fill the gap between the subsidy housing market (which caters to households earning less than R3500 per month) and the income level required to afford a bank loan to purchase a house (approximately R15000). In addition, social rental housing can often be supplied in higher density urban typologies, thus contributing to more sustainable human settlements.

### STEEN VILLA, STEENBERG

LOCATION: Military Road, Steenberg, Cape Town

DESCRIPTION: Close to public transport, economic opportunities and social amenities. 2-3 storey courtyard blocks. Unit sizes: 30 to 42 m<sup>2</sup>. All units fitted with solar hot water geysers. Ample open space and parking.

DENSITY: 700 units/ 7.5 ha = 93 du/ha)



### DROMMEDARIS, BROOKLYN

LOCATION: Koeberg Road, Brooklyn, Cape Town

DESCRIPTION: Close to public transport, economic opportunities and social amenities. 3-4 storey perimeter block. 92 bachelor flats, 58 one-bedroom and 69 two-bedroom units.

DENSITY: 219 units/ 0.8 ha = 274 du/ha

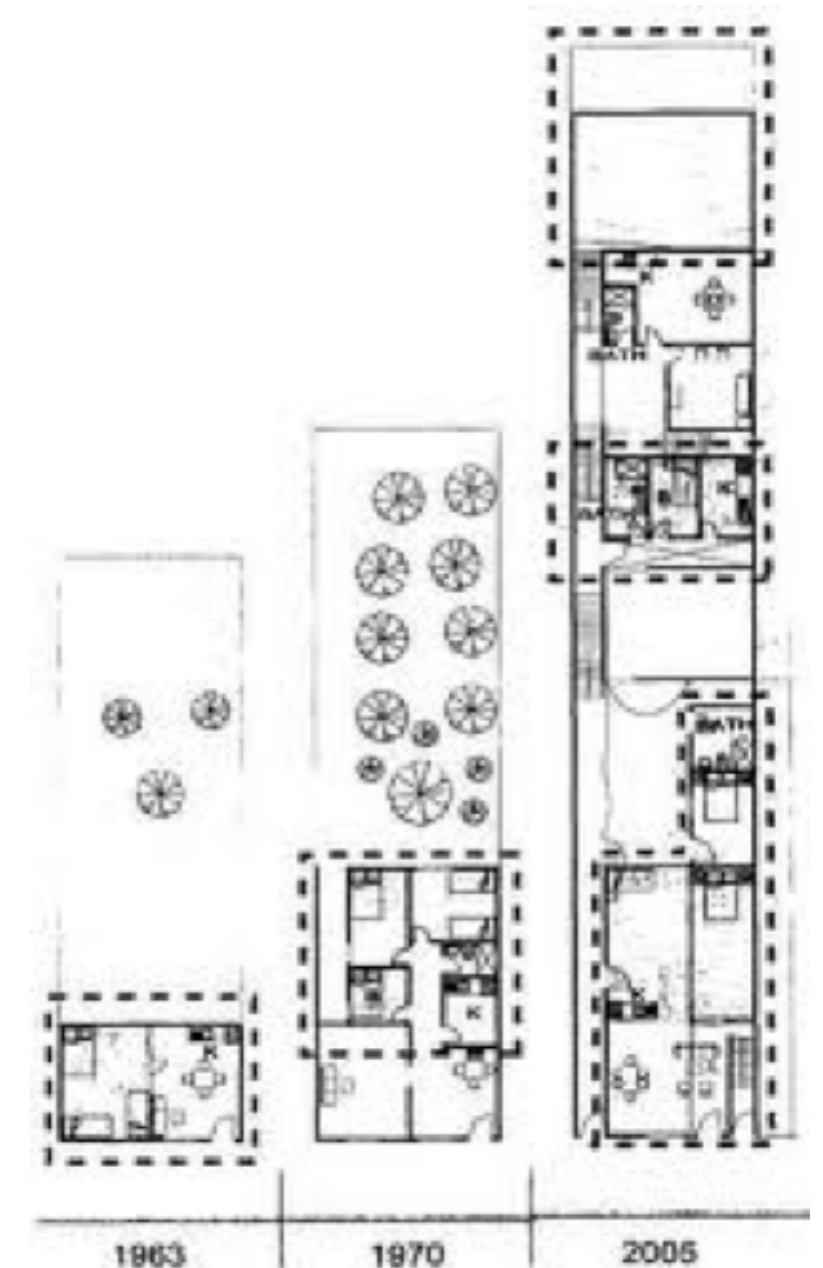


(Source: <https://www.capetown.gov.za/>)

The large range in densities created by these two developments indicates that social housing can be provided in a variety of forms. The very high net density of Drommedaris is suited to its location on a metropolitan activity street, while Steen Villa is considered fairly low density due to generous open space and parking provisions. Desired nett densities for the Wingfield social housing, are estimated to be 200 du/ha. It is envisioned that social housing will comprise a portion of the housing provided, but that there will be many options of typology and tenure in order to enable choice and a mix of incomes, supporting the broad objective of integration as well as allowing accessibility to the agricultural areas and informal market.

## ARANYA HOUSING PROJECT INDIA

Aranya Township was designed as a housing project in the form of a rectilinear site of 86 hectares and was designed to accommodate over 6500 dwellings. One of the key elements of the design was a hierarchy of open spaces that included small courtyards to be shared by three to four families, larger green spaces for each of the settlement's six sectors, and a central playing field to serve the entire development.



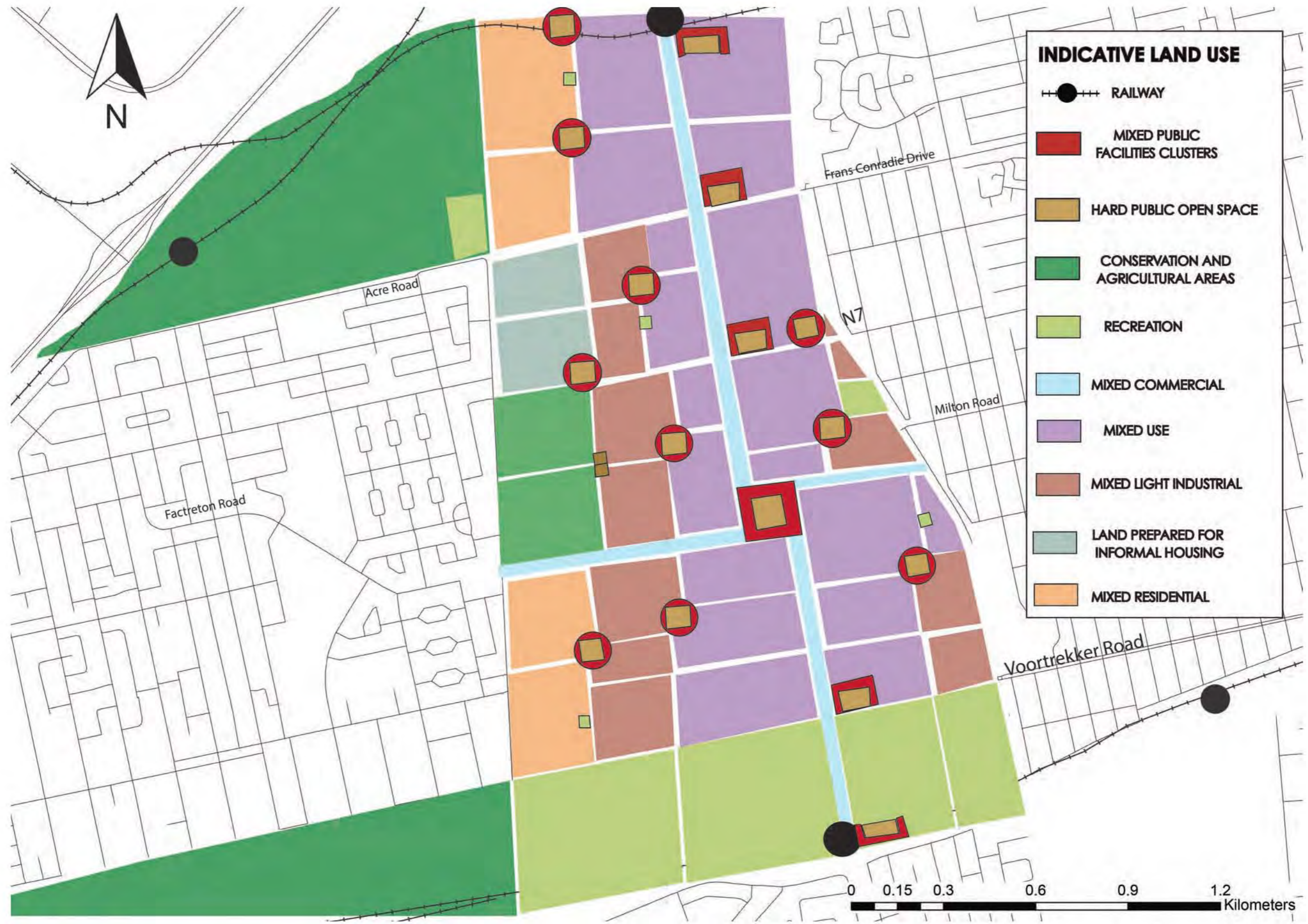


Figure 65: Indicative Land Use for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

## DENSITIES AND HEIGHT POLICY

One of the aims of the Wingfield site is to maximise the intensity of the space in order to promote compaction of Wingfield. Densities vary in relation to different facilities and activities. To this extent, the highest densities are proposed close to the centre, namely, the section surrounding the main civic square, situated in the centre of the plan. The densities then lessen towards the edge of the site. The highest intensities are also found along the primary activity spines, as these areas require high population thresholds in order to function optimally. Furthermore, these areas accommodate a variety of land uses. Medium intensities are located along the areas of mixed light industry, just off the major activity spines. These areas require a fairly high population threshold and accommodate a variety of lands uses. The lowest intensities are found towards the edges of the site, where there is less socio-economic and civic activities found (See figure 66)

The height policy is shown in figure 67. The tallest buildings signify important intersections along the route and are therefore envisioned to be landmark buildings. The tall to medium buildings serve to increase residential densities in different areas of the plan and are associated with open spaces.

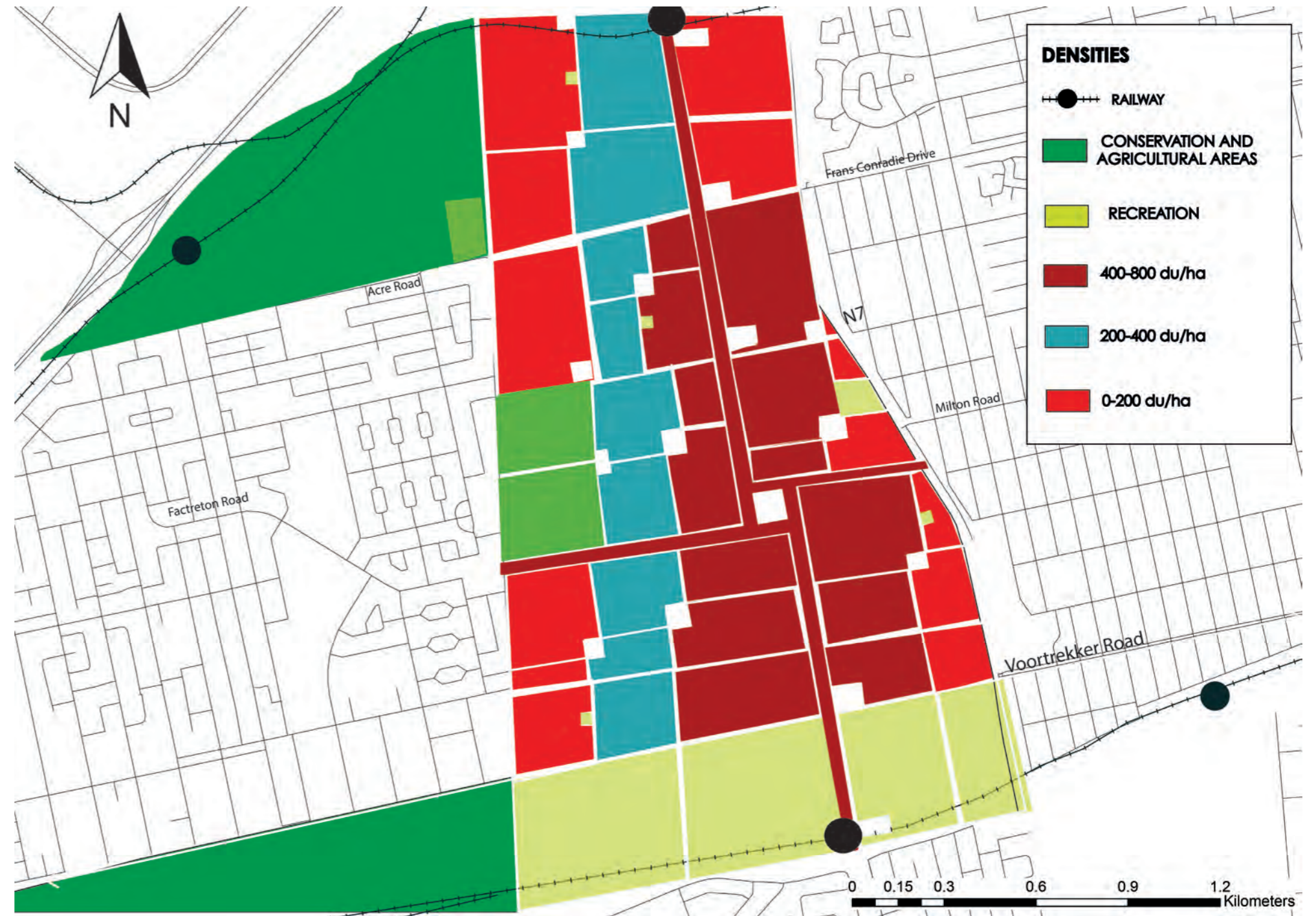


Figure 66: Densities proposed for Wingfield  
(Source: Author; GIS Technical Library, University of Cape Town)

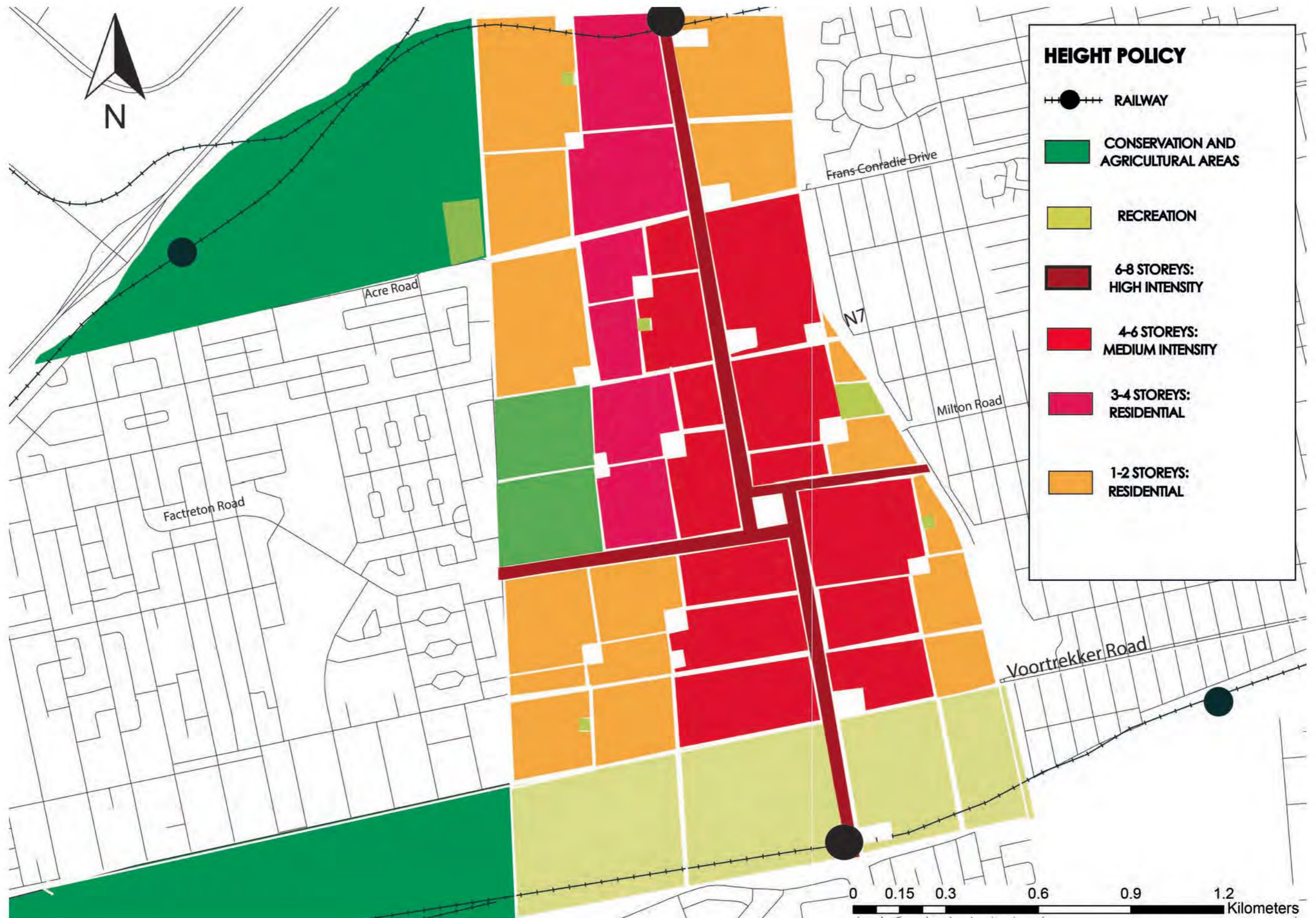


Figure 67: Height Policy for Wingfield  
 (Source: Author; GIS Technical Library, University of Cape Town)

# PROGRAMME

## PUBLIC FACILITIES PROVISION

The total size of the developable portion of the Wingfield site is approximately 270 ha. Given a nett density across lower and higher income residential areas of around 200 du/ha, and a mix of uses across the site. Based on an average household size of 4 people, the estimated population is approximately 10 000. Table 3 below, sets out the estimated public facilities and services provision. These include the: educational facilities; health and emergency facilities; social facilities; recreation and open space. These public facilities and services are required to support the expected population.

<b>Educational Facilities:</b>	Du/Fac	Pop/Fac	Distance	Ha/ Facility	<b>Facilities Required</b>	<b>Total Ha</b>
Tertiary Education Facility	37500 du/ fac		Located on major transport route with public transport stops	3-5 ha	1	<b>5</b>
Secondary School	2500 du/ fac	6000-10000	2.25 km	3 ha	4	<b>12</b>
Primary School	1000 du/ fac	3000-4000	1.5 km	2 ha	3	<b>6</b>

<b>Health and Emergency Services:</b>	Du/Fac	Pop/Fac	Distance	Ha/ Facility	<b>Facilities Required</b>	<b>Total Ha</b>
Clinic	5000-40 000 du/ fac	5000	1.5km	0.2 ha	2	<b>0.4</b>
Day Hospital	6250 du/ fac	10 000	2km	0.5 ha	1	<b>0.5</b>
Police Station		60 000-100 000	8km	0.2 ha	1	<b>0.2</b>
Fire Stations		60 000-100 000	20 min response	1.2 ha	1	<b>1.2</b>

<b>Civic and Public Facilities/Services:</b>	Du/Fac	Pop/Fac	Distance	Ha/Facility	<b>Facilities Required</b>	<b>Total Ha</b>
Civic Centre	2500 du/fac	200 000	1.5-2.25 km		1	
Community Hall	1800 du/fac		1.5-2.25 km	500m2	4	<b>0.2</b>
Library		10 000	1.5km	130m2	1	<b>0.013</b>
Municipal Office		12500	2km	0.3-0.5 ha	1	<b>0.5</b>
Magistrates Court		N/A		0.5-0.2 ha	1	<b>2</b>
Places of Worship		2000		150 m2	2	<b>0.030</b>
Post Offices		11 000		500 m2	1	<b>0.05</b>
Local Market		5000		Variable	2	

<b>Recreation and Open Space:</b>	Du/Fac	Pop/Fac	Distance	Ha/Facility	<b>Facilities Required</b>	<b>Total Ha</b>
Sports Stadium	2500 du/fac	1 per population of 300 000 people		1	2-3	<b>3</b>
Sports Field		3000	300 m from schools, 500m-1.5 km from other facilities	0.56 ha required for 1000 people	4	<b>2.24</b>
Indoor Sports Club		1 per population of 300 000			2	
Swimming Pool		1 per population of 60 000 people			1	
District/ Regional Park				0.2 Ha for 1000 people: Avenue of 10 Ha for district park for 50 000 people	1	
Community Park			1 km		1	
Pocket Parks			300-700 m	500 m2	4	<b>0.2</b>
					<b>TOTAL</b>	<b>33.65</b>

Table 3: Public Facilities and Services Provision (Source:CSIR,2010; Behrens and Watson,1996;Western Cape Government,2010)

Notes:

-Nett density: 200 du/ha (range of incomes and typologies)

-The provision of public facilities and services is based on CSIR Social Facilities Guidelines 2010;Western Cape Development Parameters 2010 and Behrens and Watson, 1996.

-Schools to share communal sports facilities, libraries and other facilities

-Requires further investigation into government and social demand

-Within 5 minute walk of public transport stop or activity node

-Facilities shared and grouped in clusters where possible

-Sports complex 200 x 120 which includes sports facilities (sports fields) and a club house

- Protected wetland park in the top western portion (50 ha), within 1km of site contributes to requirements

-Within walking distance of residential units that use urban agriculture

## LAND USE BUDGET

Based on the above calculations, Table 4 (opposite) allocates the remaining land to other uses as follows: movement (20%); light industrial (workshops, manufacturing and warehousing, 5%); commercial (office and retail, including informal trade, 5%); mixed use (primarily high density residential with potential for mixed for commercial on the ground floor, 5%); lower income residential (primarily medium density social housing catering for an income between R2500-R7500 per month) and higher income residential (primarily medium density sectional title units).

The total amount of land allocated to these uses is 60% to Housing and community facilities and 40% allocated to "other" which includes, movement, commercial, industrial and open space. This also amounts to, 58 ha allocated to housing, and 42 ha to "other".

### Wingfield Facilities Provision:

Size of developable area: 270 ha

Number of units: 2500 dwelling units

Household size (estimated): 4 people/du

Population: 10 000 people

LAND USE	DESCRIPTION	LAND AREA (SITE)	
		HA	% of total
Public Facilities and Open Space	See Public Facilities Provision	33.65	12.46%
Commercial	Office & Retail, including Informal Trade.	13.5	5%
Industrial		13.5	5%
Mixed-Use	Primarily Residential with commercial on the ground floor	13.5	5%
Movement	Streets and Parking	54	20%
Housing	Medium-density social housing (Income: 2500-7500) High-density sectional title units (Higher income)	141.85	52.54%
	<b>Total</b>	<b>270</b>	<b>100%</b>

Table 4: Land Use budget (Source: Author, 2015)

## CHAPTER 9

### PRECINCT PLAN FOR WINGFIELD

The precinct plan is the instrument where planning begins to communicate with urban design and architecture, and is usually accompanied by controls and guidelines. The precinct plan depicts the transition from the super block level (at the site scale) to block level. Essentially, the precinct plan presents the implication of different building or housing forms for plot size and configuration. This enables the use of different building types to achieve structural conditions.

#### LOCATION OF THE PRECINCT AREA

Figure 68 identifies the area chosen for the detailed precinct design. The area was chosen because of its role as the civic heart of the Wingfield development proposal. The area also consists of the highest densities in the development proposal, which provides a basis for the range of public facilities clusters and the need for a diversity of housing typologies. The aim of the precinct design is to indicate how different hierarchies of movement and facilities can be integrated in a way that achieves social justice and accommodates a variety of lifestyle choices.



Figure 68: Identification of a Precinct Area  
(Source: Author; GIS Technical Library, University of Cape Town)

## URBAN DESIGN PRINCIPLES

The overarching principles, which aims to guide the precinct design, include:

*Placemaking:* Public spaces and green open space should be used as structuring elements and should respond appropriately to the natural and cultural context. The quality of the public space is thus crucial. All public space is defined and enclosed (for example: by planting; walls and colonnades or combinations of these). This allows for the optimization of surveillance and landscaped environments. As a general principle, buildings should never back onto public spaces, including streets.

*Access:* This refers to the hierarchy of the movement systems and their associated public spaces and facilities. A great emphasis is placed on prioritising safe pedestrian movement and exposing public facilities around highly accessible points.

*Choice:* Contrast public spaces of greater activity and interaction with places of relief and relaxation to create vibrancy and interest. This allows for options in terms of typology and tenure and sets up a wide variety of lifestyle choices ranging from very public to private.

*Efficiency:* Land utilization and services (efficiencies of infrastructure) is achieved through the clustering of public facilities in order to share resources and by intergrating public open space with utility services such as stormwater management, in order to serve multiple functions.

*Opportunity:* This refers to the clustering of collective service points and public markets at points of good access to create favourable trading for small-scale enterprises.

## DETAILED PRECINCT DESIGN

### *The Conceptual Grid Explained*

The Wingfield development proposal is based on a 300x300 meter conceptual grid. The grid can yield numerous levels of structural order and opportunity through a process of differentiation, which is achieved through different geometric forms (Dewar & Uytendogaardt, 1995). The conceptual grid therefore provides a structuring framework for establishing the 300x300 meter superblocks, as it enables a connection with major through routes and allows for the distortion of the grid to create public spaces using a "pinwheel". These higher order roads are the vehicular integrators that tie the Wingfield development with the surrounding areas of Goodwood, Kensington and Century City. At the intersection of these routes there are good opportunities for clusters of public facilities and the stimulation of socio-economic activity. The Grid is said to be the most permeable form of settlement layout as both vehicles and pedestrians are able to penetrate and circulate the area with ease. Furthermore, the grid does not have to conform to a rigid pattern but could follow a more curvilinear arrangement (CSRI,2000).

## BREAKING THE SUPERBLOCK

The first step in the precinct design process involved breaking down the coarse grain 300x300 meter superblocks in order to achieve a more fine-grain urban fabric that allows for the implementation of urban design principles, to create more positive urban environments. The four super blocks were carved up to produce a 20-65-10 meter conceptual grid, shown in figure 69. Block sizes should be informed by the remnants of historic blocks, which favour the provision of small blocks (60-80 meters in length or width) (District Six Development Framework,2012). To this extent the 65x65 meter blocks are consistent with the Cape Town historic CBD grid. The 20-meter-wide secondary activity routes frame the outer perimeters of the super blocks, whilst 10m streets define the 65x65 meter developable blocks. This is used to provide a platform in which the design will be structured over. The natural grid is therefore a starting point, and can be transformed through fracturing or distorting the grid, presenting further unique spaces and opportunities.

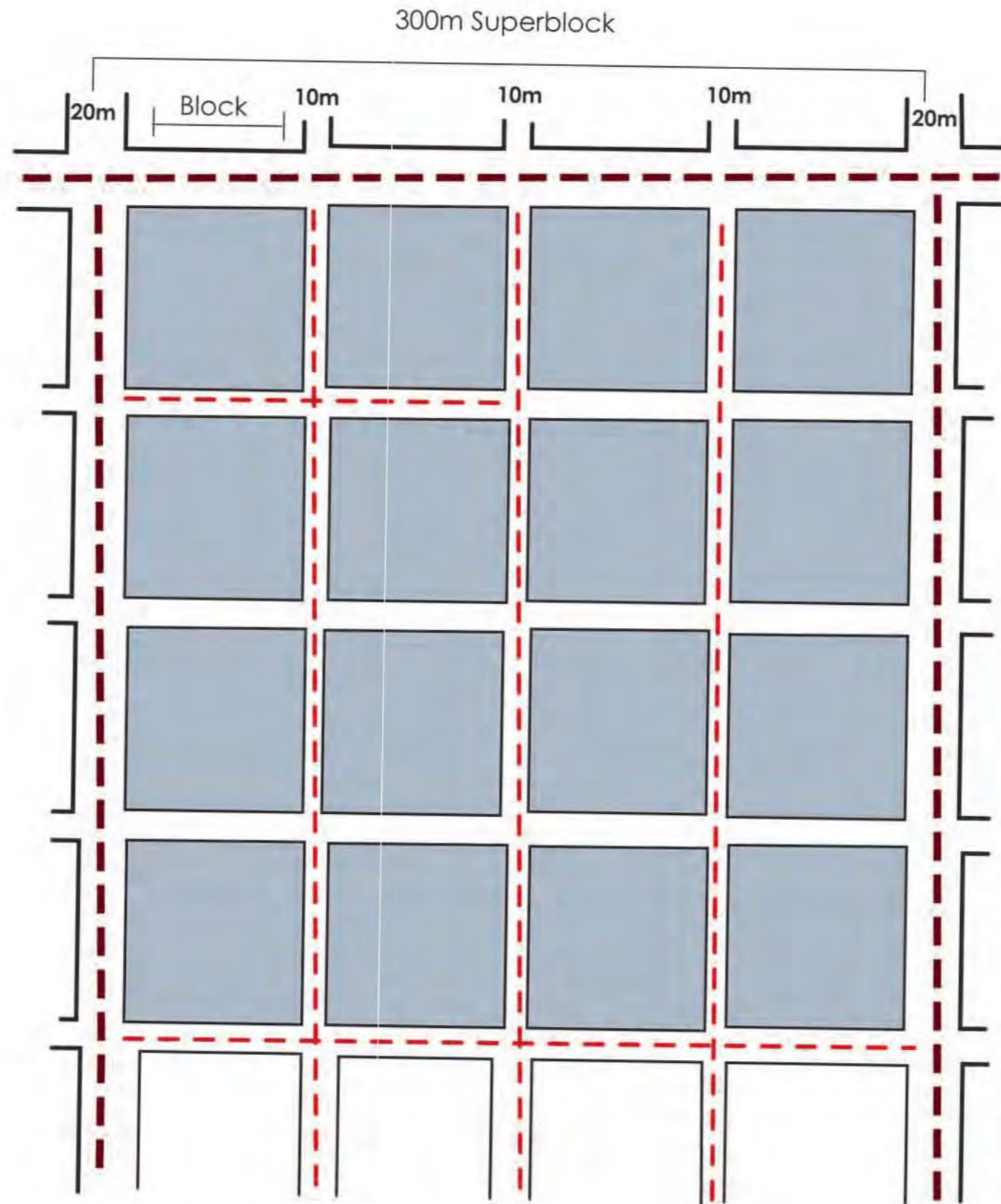
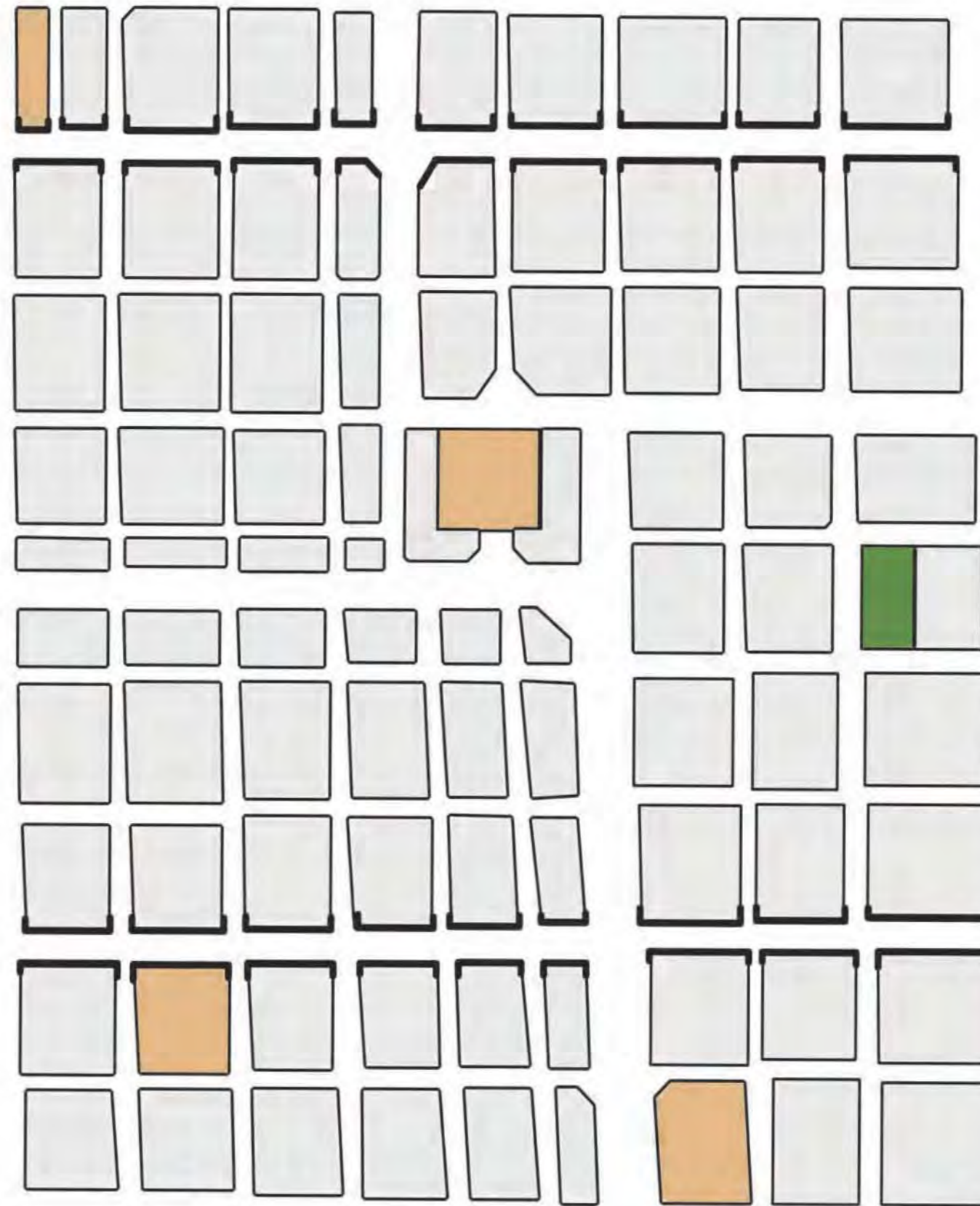


Figure 69: Carving up the Superblock: The conceptual model (Source: Author, 2015)

The public open space and broad land use indicators that has been proposed in the larger plan for the Wingfield development, were placed over the grid and used to inform the different plot layouts and building typologies.



## Urban Public Space

 Hard Open Spaces

 Soft Open Space

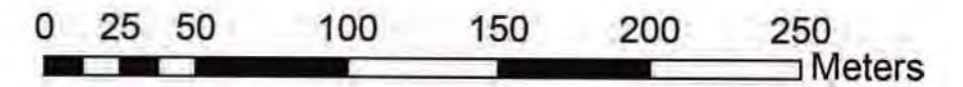


Figure 70: Block Layout:Urban Public Space  
(Source: Author,2015)

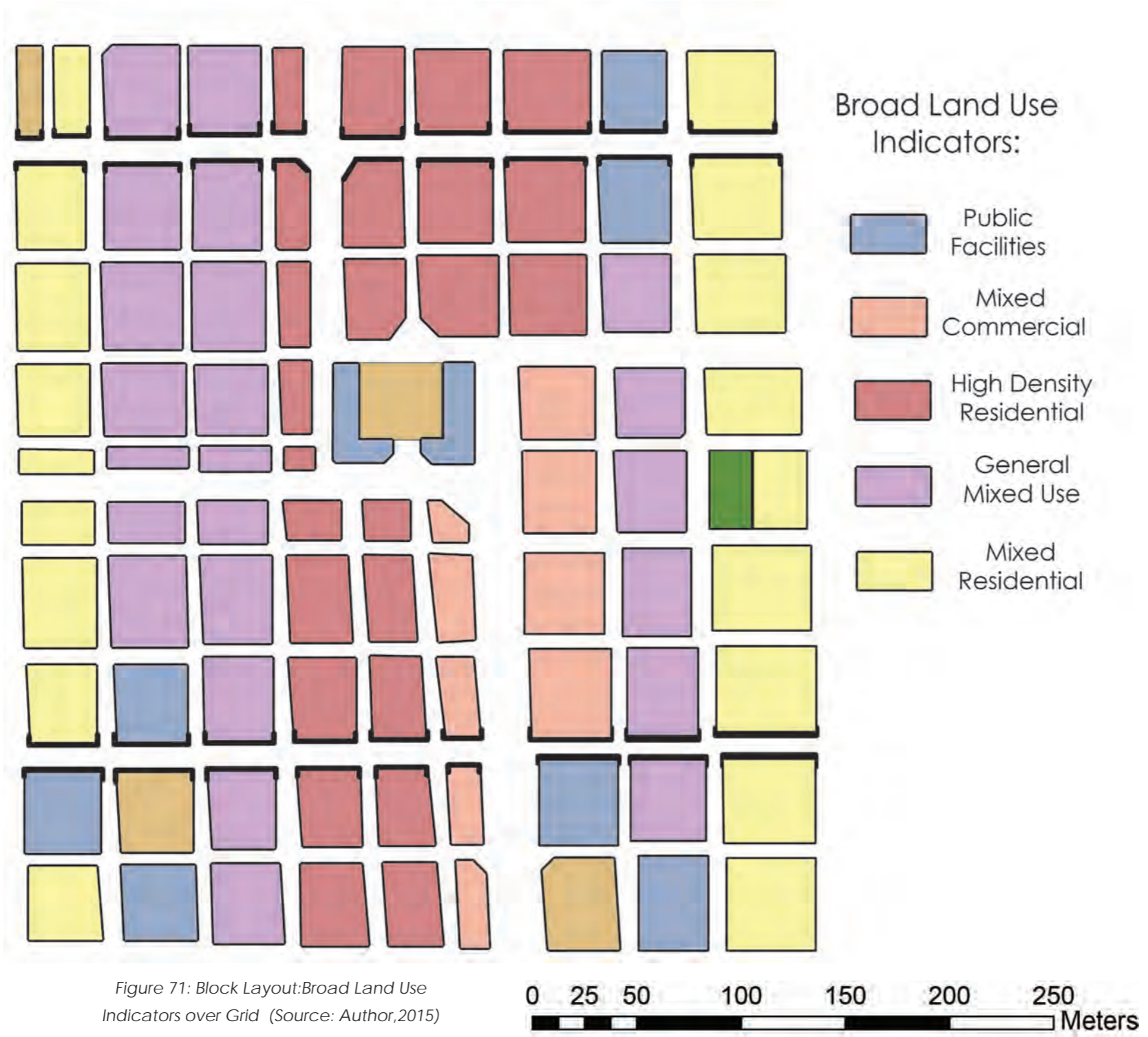


Figure 71: Block Layout: Broad Land Use Indicators over Grid (Source: Author, 2015)

## STRUCTURAL ELEMENTS AND DESIGN CONCEPTS

The block sizes and layout structure allow for a variety of building and residential typologies in order to provide choice and variety within the precinct. These locations also offer the opportunity for structural urban design elements, such as landmarks to promote legibility and provide a sense of appeal to the urban structure. The blocks will accommodate longer plots with narrow frontages to ensure efficient conditions for service and infrastructure provision. This is reinforced by Behrens and Watson (1996) who states that the straight block designs make reticulation services more cost effective and easier to maintain.

### Movement Hierarchy

#### Vertical and Horizontal Corridors (Section A-A)

The first structuring element is the vertical and horizontal activity corridors. These activity corridors are the main higher order and primary mixed-use activity spines that cut through the site perpendicularly creating a pinwheel and a civic heart where they intersect. These spines consist of high-intensity mixed-use commercial buildings which accommodate a variety of uses, such as, retail on the ground floor; offices on the first few floors; and apartments on the top floors. The buildings include intimate street frontages that function as colonnaded pavements with landscaping (street planting and canopies) produce comfortable pedestrian environments. The two main activity spines are 30m wide and operate as a multi-functional boulevard, which accommodates a variety of different movement modes and activities.

Section A-A depicts the way in which the building frontages operate onto a 3 meter wide colonnaded sidewalk, which serves to facilitate the majority of pedestrian movement. Alongside the pavement, there is landscaping and a 2.5 meter wide on street parking lane which is adjacent to the 2m wide dedicated bicycle lane. The street also consists of two double lanes (6.5 meters each) to accommodate both car and the internal tramline. Furthermore, there is a 3 meter wide transit platform, on which the tram transit stops will operate. The tram line also moves directly through the civic node between two landmark buildings.

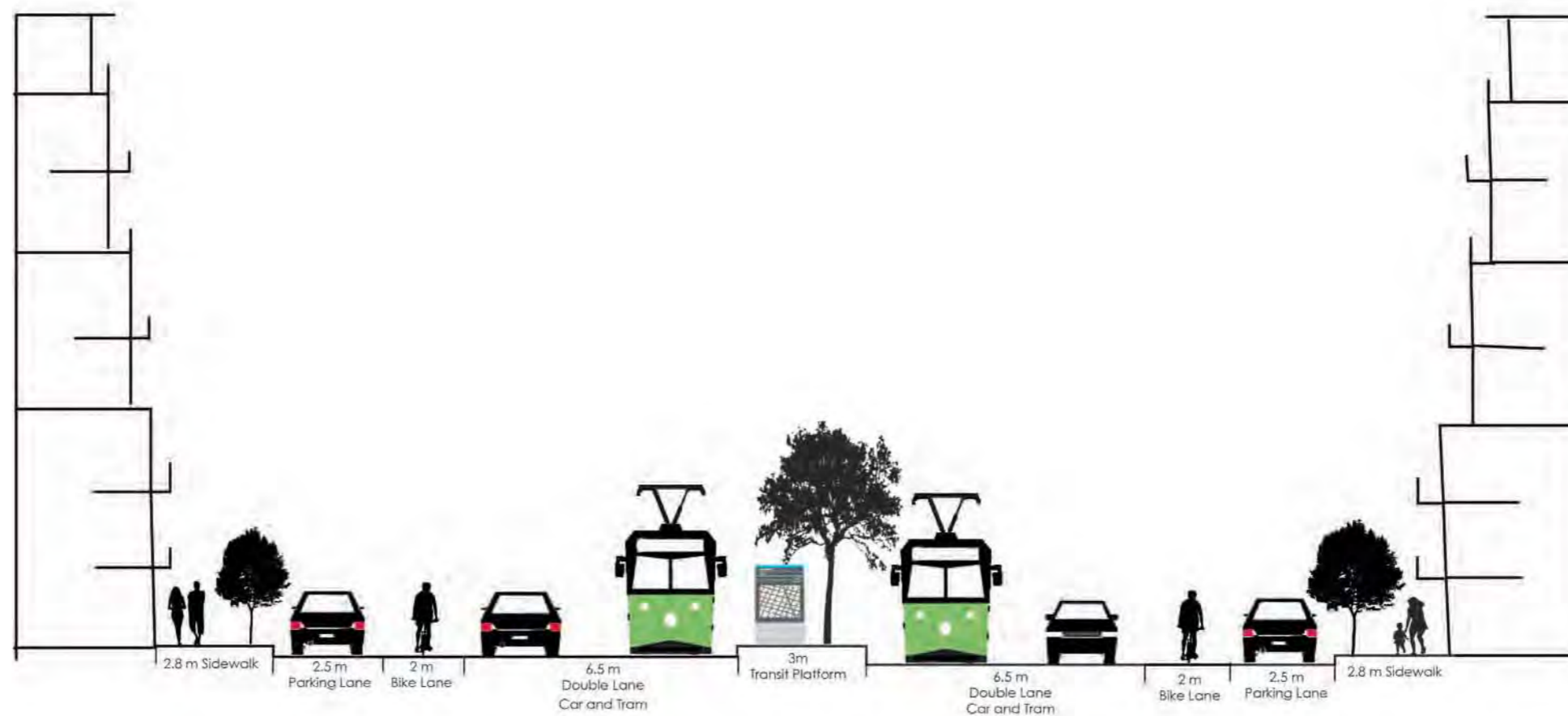


Figure 72: Cross Section of the 30m Main Activity Route/Boulevard

### Secondary Activity Routes (Section B-B)

The secondary activity routes are 20 meter wide streets, which frame the superblocks. Medium Intensity buildings line these routes and promote on-street social interaction via the 3 meter sidewalks. These routes also include a dedicated bicycle lane (1.5 meters) and a dual carriageway which accommodates both the car and bus system. A 2 meter median sits in the centre of the street on which the BRT and bus transit operates.

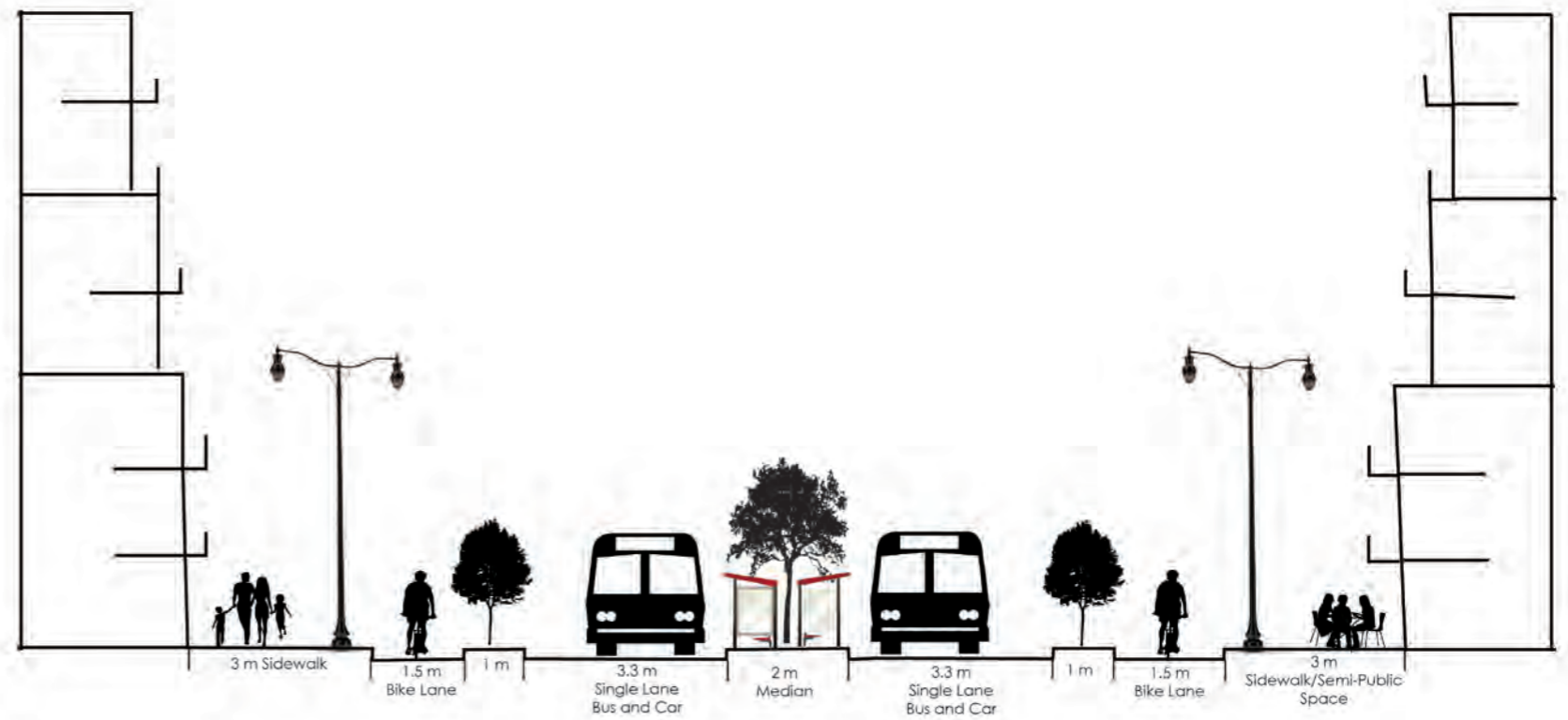


Figure 73: Cross Section of the 20m Secondary Activity Route/Internal Distributor Streets

## Local Streets (Section C-C)

These streets are 10m wide and are characteristic of extremely intimate streets, with smaller vehicular lanes to discourage fast moving traffic. The street has a 2.2 meter sidewalk on each side and the buildings adjoining these streets are generally 2-3 storeys high, however, this varies depending on the location of these streets. Pin-wheels are also located where the 10 meter streets intersect, which includes clusters of public facilities around a public space. This serves to soften the street grid and facilitate traffic calming.

Figure 75: Cross Section of a local street (10 meters)

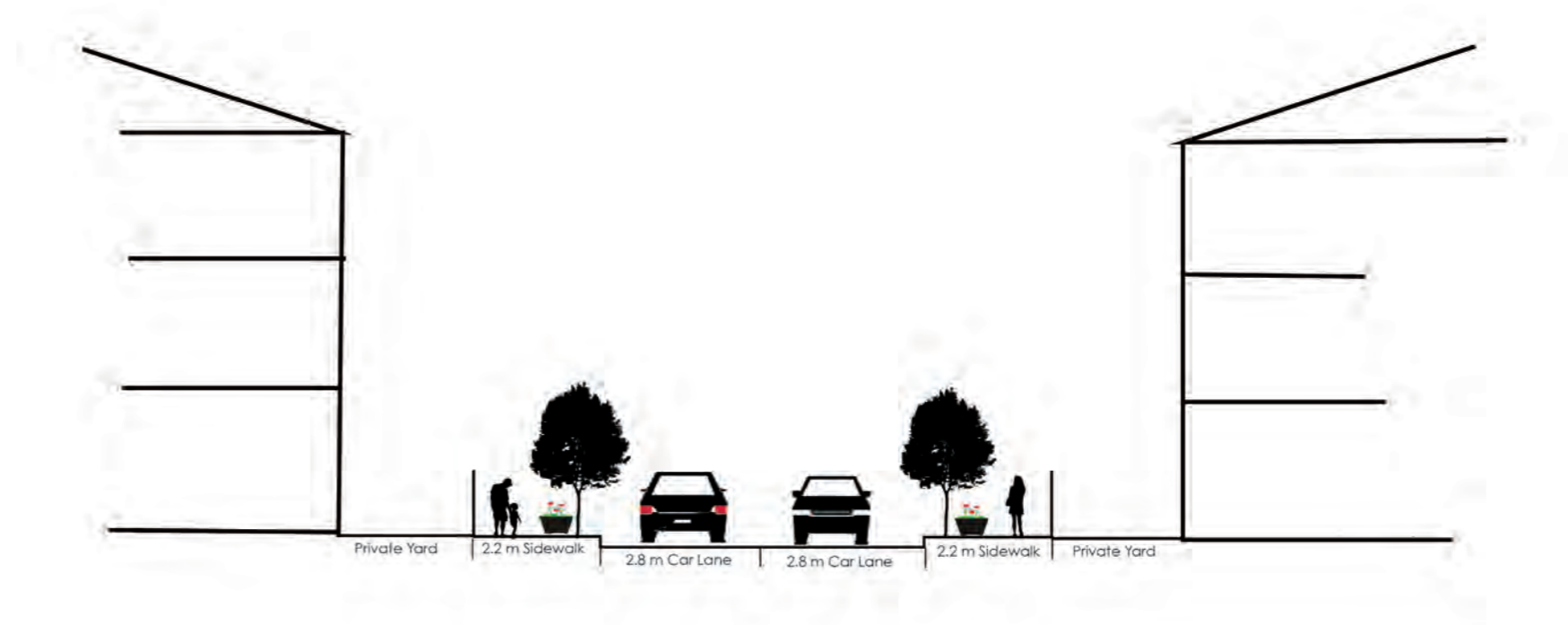


Figure 74: Cross Section of a local street (10m)

## Pedestrian Movement

Exclusive pedestrian sidewalks are strategically located to provide pedestrians with direct and efficient access to the primary civic node. These include, a pedestrian route and dedicated pedestrian bridge, which prioritise pedestrian movement and provide access to the site. The pedestrian movement routes radiate from the civic node in all directions and tie into the NMT system, providing access to recreational areas and residential pockets of the site. These sidewalks also serve to further break down the block structure and contribute to the fine-grained urban fabric. Furthermore, the walkways are landscaped with good lighting and active building interfaces, to ensure security and surveillance as well as convenience.



*Bitola, Macedonia consists of pedestrian friendly streets with mixed use buildings that contain retail on the ground floor, offices on the middle floor and residential apartments on the top floor.*



*(Source: <https://philaplanningjournal.files.wordpress.com>)*

*Les Rambles, Barcelona is an example of a 1.5 km long pedestrian-oriented boulevard, with a central pedestrian promenade. The boulevard is lined with high intensity buildings, active frontages and entrances and a row of trees, which separate the central walkway from vehicular traffic.*



*(Source: <http://www.livablecities.org>)*

*In Paris, higher density buildings with active street frontages and safe pedestrian walking spaces generates lively streets.*



*(Source: <http://img.deusm.com>)*

*The Highline in Manhattan, New York. is an example of pedestrian bridge*

## Great Civic Square

The primary civic node (civic heart) functions as the focal point of community life and civic activities. The "great square" is accompanied by high intensity mixed-use buildings that front onto the square. These buildings are oriented inwards in order to maximise natural sun light and shield the space from the harsh south-easterly winds.

The square will accommodate both formal and informal commercial activities and a tertiary public facilities cluster, which includes tertiary educational and civic facilities such as a municipal office and magistrates court, local business service centres and community information centres. The tertiary centre will also include secondary and primary facilities. The edges of the square are lined with cafes and restaurants as well as small formal retail.

Informal trade in the form of a permanent market will be located in the centre of the square with large trees creating a canopy over the space and which serves to enclose the space.

Great Public Squares Precedent:



(Source: <http://www.travelstart.co.za>)

Green Market Square, Cape Town is an example of 60x60 meter square that accommodates formal and informal commercial activities.

The secondary and primary public open spaces are surrounded by clusters of public institutions and facilities. These hard open spaces allow for a variety of social and civic activities such as festivals and other civic social gatherings, as well as, informal markets and trading activities. The precinct includes a informal market or farmers market for the sale of fresh produce. The provision of soft open spaces such as a pocket park provides relief and relaxation from the dense and intense urban environment. These hard and soft open spaces therefore serve to balance the high-density living and invite social interaction and the creation of vibrancy. The multi-functional courtyard spaces provide further opportunities for a landscaped soft or hard open spaces that act as extensions of private dwellings and create semi-private spaces or "collective living rooms" .

Public Facilities

Additional public facilities are also required within the precinct, the majority of which are clustered around the various public open spaces and provide public services to the residents, for example, secondary public facilities such as a secondary school and day hospital, worship centre, community centre, a library and post office. The primary facilities, include, primary schools, clinics and privately owned preschools and crèches. These public facility buildings also serve as landmark buildings, which promote legibility throughout the precinct.

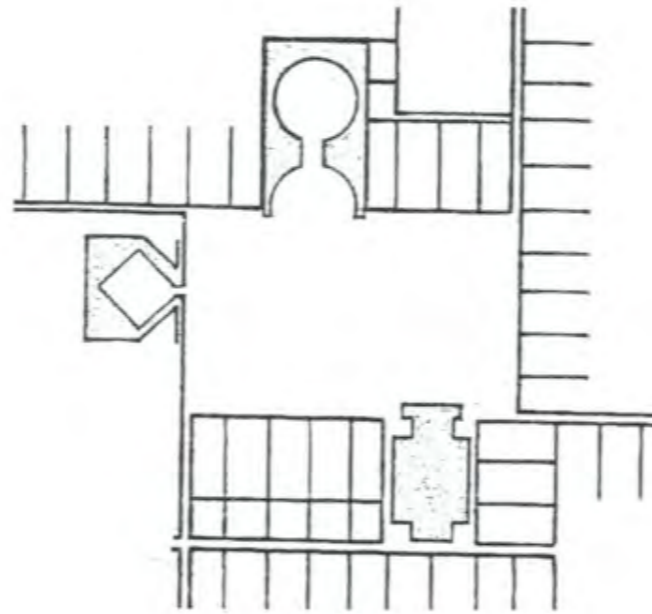


Figure 75: Higher order spaces create a logic for public facilities which allow for shared or common facilities can relate directly to or locate within these spaces (Source: Dewar & Louw, 2013).



Source: <http://www.pps.org>

Paley Park, is a pocket park situated in Manhattan, New York. It also has comfortable seating arrangements, food vendors and a waterfall that provides a dramatic focal point and a reason to enter the park. Furthermore, the noise of the waterfall blocks out the sounds of the city and creates a sense of quiet and privacy.

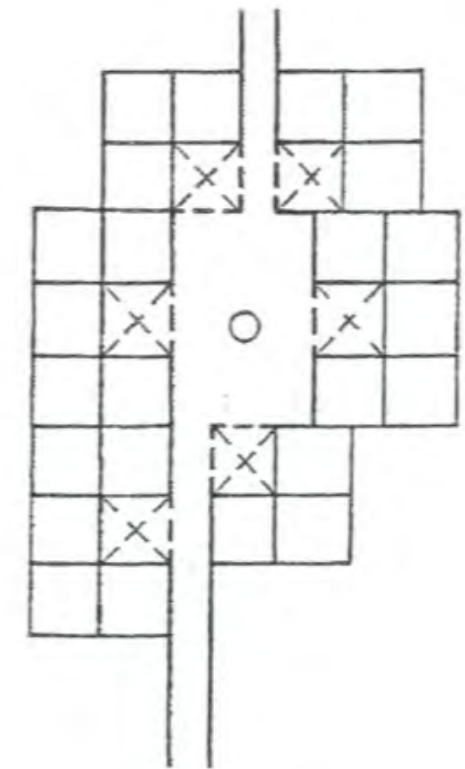


Figure 77: Housing around a small public space, which acts as a "collective living room" (Source: Dewar & Louw, 2013)

## Explanation plot layouts and built form typologies

The variations in plot sizes are designed to provide a range of choices made available in the precinct. This will allow for the creation of an urban environment that offers areas that are exposed to more public activities, to areas which range from semi-private to private. Furthermore, the plot layouts aim to create unique features that emphasize the structural role of different building forms or typologies.

### Residential Typologies

#### High Density Apartments

The high-density apartments are six to eight storey buildings, which are mostly residential but also allow for mixed-use activity to occur on the first few floors. These high intensity buildings are situated off the major horizontal and vertical spines in the precinct, and serve to reinforce the main activity routes. The unit sizes vary and will be accessed via lifts, as the buildings are higher than 4 storeys.

#### Medium to High Density apartments

The medium to high-density apartment blocks vary from four storey walk-ups to larger five to six storey blocks. The first floor of these apartments can be used for mixed-use activities and are an optimal location for small-scale businesses.

#### Perimeter Housing

The perimeter housing typology consists of wide plots and include three apartment blocks and a central court. Perimeter Housing is located to the back of the medium to high-density apartments and offer the highest degree of privacy. The public space (courtyard) is usually communal and landscaped, and provides multi-functional open space opportunities. This presents opportunities for the space to be used as an agricultural court, a parking court or a general use hard or soft open space. Furthermore, the central court serves to optimize surveillance as housing fronts onto public space and therefore security is not seen as gated. The perimeter blocks consists of medium intensity buildings in the form of 3-4 storey walk-ups, and therefore do not include lifts.

Furthermore, they are limited in height to four storeys to ensure adequate daylight access to the open space and apartments. Perimeter blocks can define the communal open spaces in variations of L, T and U-shape buildings; however, the U-shape is the most efficient and most commonly used

variation. Furthermore, the perimeter-housing configuration usually consists of between 6-8 plots per block and have the potential to contain units varying between 50 to 80m<sup>2</sup> (Milanovic,n.d.).

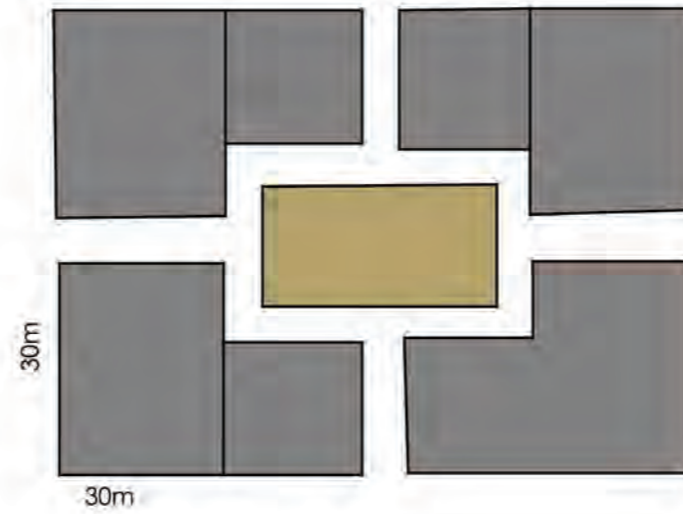


Figure 76: Typical Perimeter block sizes

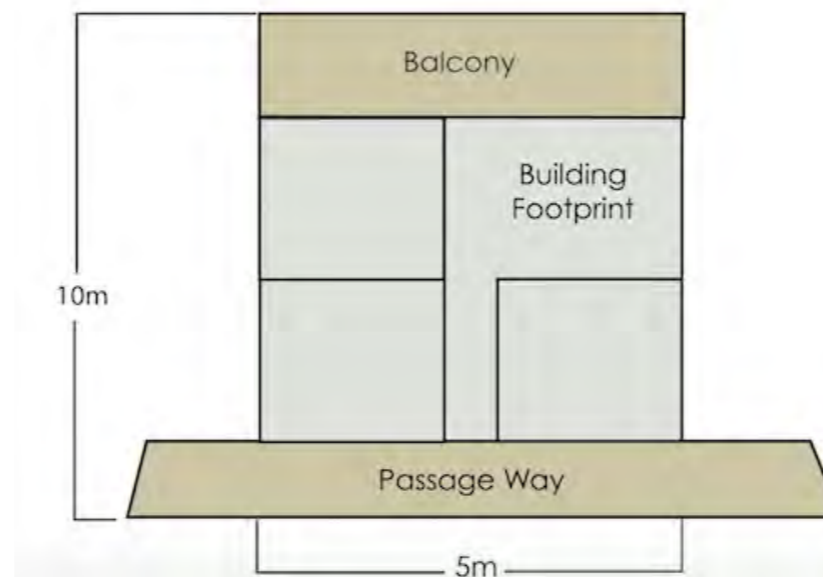


Figure 77: Typical Perimeter unit sizes

#### Row Housing

Row or Terraced housing is another form of medium density housing. This housing form consists of lateral units that share a sidewall, and usually occurs in a run of 24 meters or 4- 5 houses with a gap before the next row. The height and form of these houses vary but they typically consist of plot sizes, which are narrow and range from 3.5 to 7 meters in width and 15 to 18 meters in depth, and include a street frontage with a minimum of two-storeys. According to Behrens and Watson (1996), row housing requires a minimum width of 5m to enable acceptable room sizes. Row Housing can either be street aligned (zero building lines) or set-back (with a common setback of 5m). This setback provides a transitional or threshold space of 2.5 meters for a front garden and 2.5 meters for a stoep or porch zone. In the case of reticulated services, narrow erf widths increase the number of households per unit length of service run or road length, and is therefore seen as the most cost efficient option as it minimizes the cost of service provision per erf (Behrens & Watson,1996).

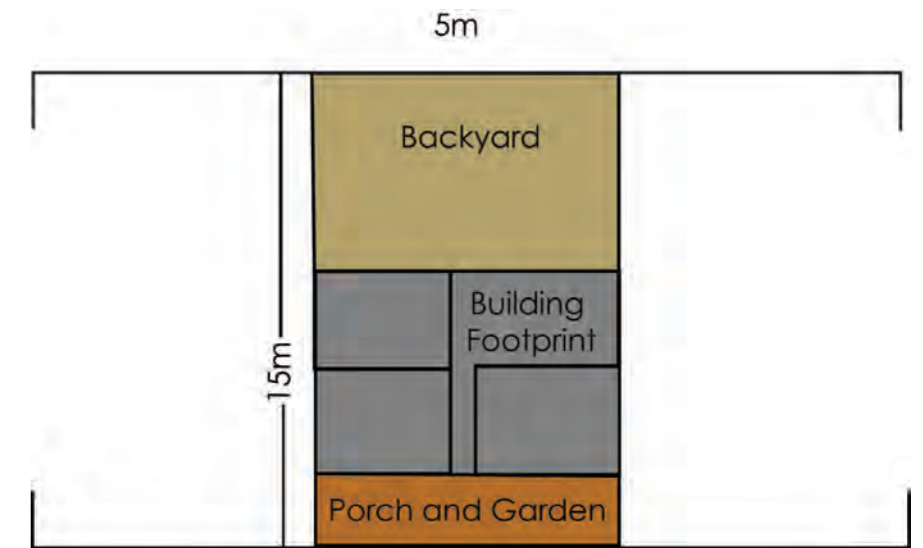


Figure 78: Layout of a typical Row Housing Unit

## Key Layout Features

### Street Liners

Street liners consist of a narrow frontage and a longer plot. These narrow frontages accommodate more units and are most efficient for row housing. Furthermore, street liners include a common setback of 5 meters (this includes 2.5 meters for a small front garden and 2.5 meters for a stoep or porch zone), which is a control system that serves to increase the threshold of privacy. In the case of street liners, row housing is suitable for commercial or retail use on the ground floor level or live/work apartment layouts. Street liners are a series of connected residential units that share a common side wall and are located along linear movement or activity routes. Street liners promote intensive on-street interaction and provide less of a threshold between public and private spaces. The precinct plan offers street liner units that vary in terms of building setbacks. This provides variety in terms of privacy threshold levels and reinforces idea of choice in the precinct.

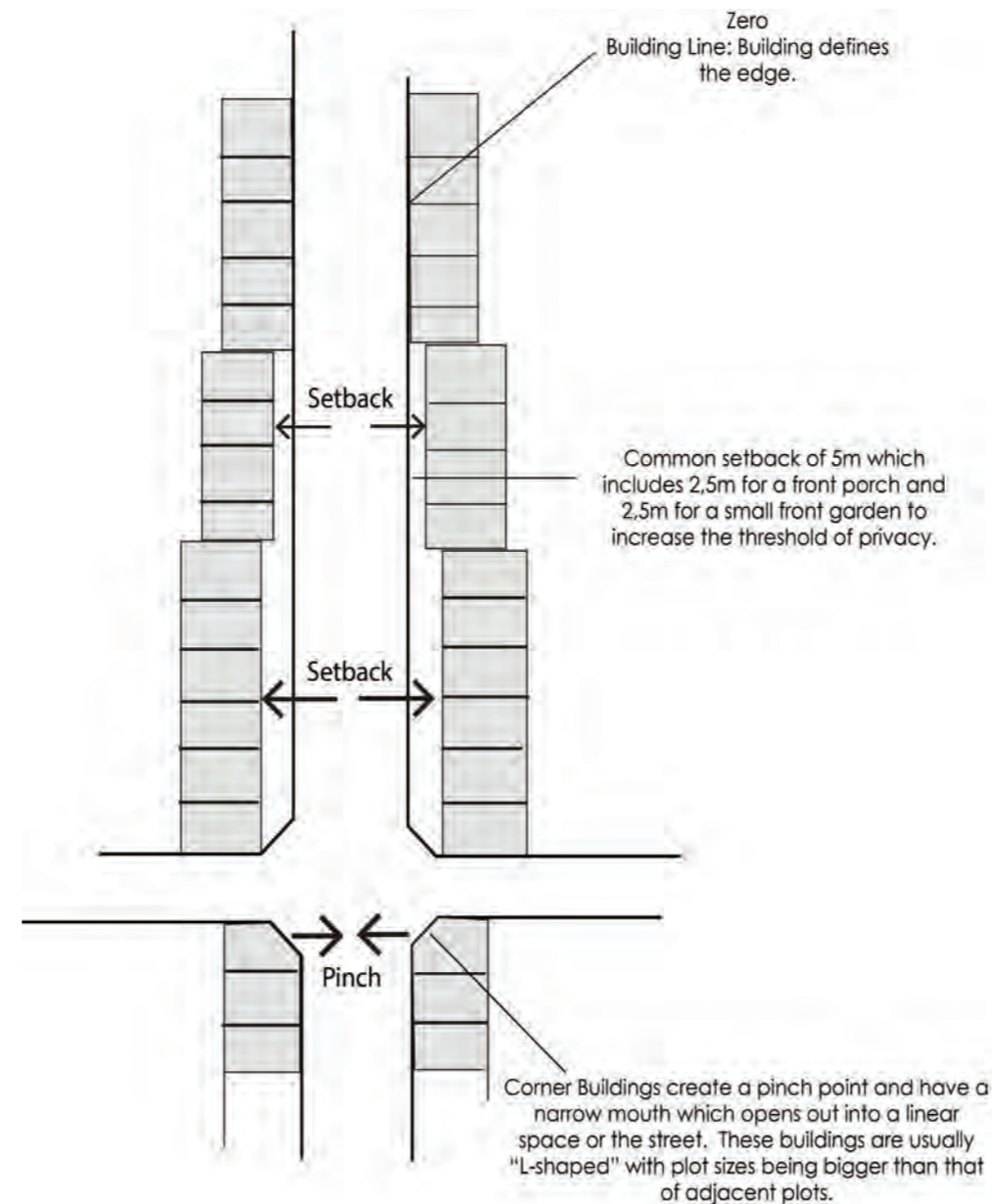


Figure 79: Street Liner Unit Options (Source: Adapted from Dewar & Louw, 2013).

### Landmark Buildings

A landmark is a legible feature which can be used to assist in giving direction or to provide a reference point in an area. This is reiterated by Lynch (1960) who states that landmarks are a point of reference which are external and physically defined and take various forms, for example, a building. They are also frequently used clues of identity and structure as they stand out from a nearby environment and are visible over long distances. The proposed location of the two major landmark buildings is at the centre of the precinct and marks the entrance to the great civic square. Furthermore, the landmark buildings located in the precinct take on the structural characteristics of the corner building.

### Corner building

Corner buildings occur where the major routes intersect to create bigger corner plots, which have the potential to be defined by unique landmark buildings that function as a point of reference (ibid.). The corner buildings in the precinct area are intended to enhance the pedestrian space at the intersections of two roads by either providing unique social activity or enhancing legibility. The plan requires that the corners of these buildings be splayed, and that corner units be higher than neighbouring plots to create a gateway where the roads meet and to allow them to be easily identified. The creation of a corner building as a local landmark is also conducive to small retail enterprises such as a corner shop, which should have its entrance on the corner. Corner buildings are strategically located and contribute to the structural geometry and legibility of the Wingfield site. Corner units create a pinch which opens into a linear narrow space, which is the street.

### Pinch Point

The aim of the "pinch point" is to announce a change in the nature of the road from a vehicular based to one that prioritizes pedestrian movement, and thus to promote traffic calming as well as to signal change from more dense and intense public areas to quieter residential areas. The building typology should be splayed at the corner to signify the arrival into these spaces.

Both street liners and corner buildings therefore play a structural role in the design.

### Pinwheel

Pinwheels create breaks in the systematic flow of movement through an area. They allow for a unique structural element that forces movement to travel around rather than through a particular feature. In the case of the precinct, the pinwheel is represented by the major horizontal and vertical spines, as well as the local internal streets in the case of the site as a whole.



(Source: <http://d2g6byanrj0o4m.cloudfront.net>)

Houses in Bo-kaap are elevated from the street creating a semi-private space



(Source: <http://static.panoramio.com>).

French Quarter, New Orleans is an example of a colonnaded pavement with intimate building frontages.



(Source: <http://static1.squarespace.com>)

A Cape Corner Shop on Long Street, Cape Town

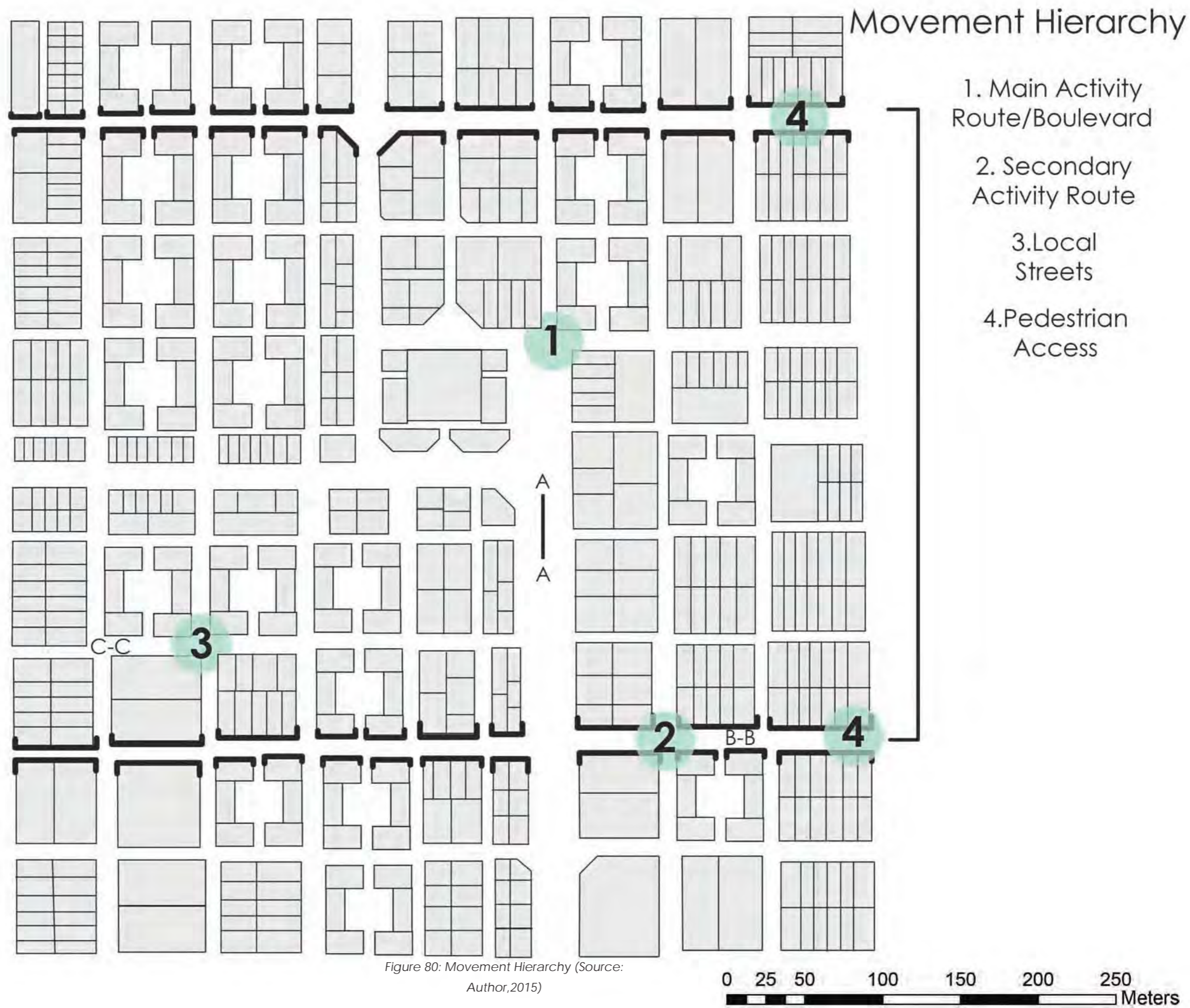


Figure 80: Movement Hierarchy (Source: Author, 2015)



## Residential Typologies and Key Layout Features

1. High Density Apartments
2. Medium to High Density Apartments
3. Perimeter Housing
4. Row Housing
5. Street Liners
6. Landmark Buildings
7. Corner Buildings
8. Pinch Point
9. Pinwheel
10. Multi-functional courtyard spaces

Figure 81: Residential Typologies and Key Layout Features (Source: Author, 2015)

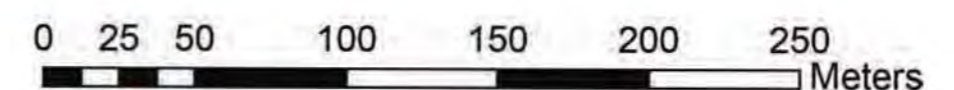
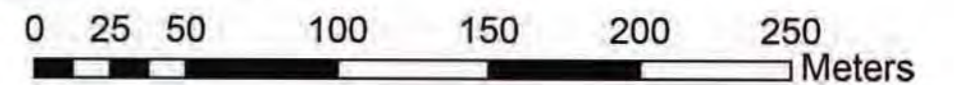




Figure 82: Subdivision Layout  
(Source: Author,2015)

Figure 84: Subdivision Layout (Source:  
Author,2015)



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## CHAPTER 10

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### IMPLEMENTATION

This section puts forward a broad based implementation framework to turn the theoretical visions and restructuring proposals put forward, into a reality. A comprehensive implementation framework is extremely complex and beyond the scope of this project. Therefore, the main implementation phases for the project shall be outlined.

#### Land Consolidation

The first step in the implementation process involves consolidation and transfer of the Wingfield land into the ownership of a single entity. The land is currently under the ownership of multiple entities, the most significant being the Graaff Trust and the Ndabeni Community Trust who were forcibly removed from the land in the 1930s and awarded a land restitution claim. The consolidation of the land will involve negotiations between these entities to either reach an agreement. This could result in a joint ownership, or a situation where the Ndabeni Trust receives some form of compensation and transfers full ownership of the land to the Graaff trust.

#### Regulatory Approval

Prior to the commencement of the development proposals, a statutory process must be undertaken. This involves receiving approval of different legal and policy regulations that are applicable to the development process. The main legal and policy regulations applicable to the project include:

-The Land Use Planning Ordinance (LUPO)/The Land Use Planning Act (LUPA)

-National Environmental Management Act (NEMA)

-The National Heritage Resources Act (NHRA)

#### Institutional Arrangements

The magnitude of the project is too large a task for the Graaff Trust (the sole entity) to oversee. A multi-disciplinary team is therefore required to oversee the project with public participation and local stakeholder interest being central

to the project. This team should comprise both public and private actors. The management team should therefore comprise: Planners; Architects (Including Landscape Architects); a private developer representative; academics; public communication experts; Land Surveyors, Environmentalists, Engineers, Property Economists and Legal Experts in addition to representatives from the Graaff Trust.

#### Bulk Services and Infrastructure

This step involves producing an engineering bulk service infrastructure master plan that can be utilized in order to determine the capacity of existing service infrastructure and the way in which additional disposable water and waste from the Wingfield development will drain off the site. This is an essential step in the process to determine where the construction phase of the development can start.

#### Strategy for Land Release

The process for land release should be informed by the argument made by Dewar and Louw (forthcoming:16) who state that "sterility and monotony are the inevitable consequences when the design process is dominated by the ingenuity and creativity of too few people regardless of how talented they are". This argument serves to reinforce Crane's (1963) notion of "a city of thousand designers". Therefore by opening up the redevelopment to a wide range of actors, the interests of the public can best be served. This also extends to all agency involved in the development and construction of the project and restriction should therefore be placed on the amount of architects and private developers that can be involved in a development. To this extent, the distribution of land should not be done in a uniform manner, as different types of development will require larger plot sizes and will be consistent with the resources of larger development companies. Smaller plots such as medium density residential development can be undertaken by smaller scale developers. This will essentially avoid monotony and sterility.

#### Phasing

The first step in the phasing process is to establish the required specialist team to manage the redevelopment project (some of whom are identified as the key role players, in the institutional arrangement), undertaking initial environmental and geotechnical investigations and beginning the process of negotiations, participation, urban design and land assembly. Once this has been established, a financial framework for the project should be devised that deals with the estimated costs for the infrastructural investments. Certain elements of the project such as the transport links, the urban park and public facilities require major public investment and upfront establishment in order to act as catalysts to unlock private development interest in the site. Furthermore, the land

prepared for informal housing could act as demonstration projects to overcome any negative perceptions held by the market of lower income developments. Given these considerations, a preliminary project phasing approach will ideally begin with the construction of the vertical and horizontal activity spines to create the needed internal and external linkages between the northern and southern transit hubs. This will be supported by developing the precincts and identified public facilities as well as the commercial activity nodes, which are located along the two spines. Thereafter, the land can be subdivided and packaged for residential development. This would require that the size of packages of land parcels to be restricted, to ensure competitive pricing and affordability and restriction of excessive profit margins, to promote diversity of the urban form. Lastly, development will expand outwards to complete the Wingfield proposal

## CONCLUSION

This dissertation provides an approach to restructuring and intensification through the formulation of a spatial framework for the Wingfield site. It comprises of dense and integrated intensification of a structurally significant place or an inner city site, which also reinforces the southern and western corridor of the CTMA. The development framework for Wingfield adopts a package of plans approach which guides the reader through the analysis and design proposals and is conducted at various levels and scales. The development and design outcomes include:

A metropolitan analysis and concept which proposes restructuring of the broader metropolitan systems.

A site and environs analysis of the study area and its sub-regional context which serves to inform the design outcomes of the Wingfield site.

An SDF at the scale of the site which includes a broad spatial concept that consists of different spatial structural elements that include: Green Space; Public Urban Space; Public Institutions and movement of all modes.

A precinct plan for Wingfield which provides a more fine-grained detailed design that includes sub-divisions and the structural role of different building forms for plot size and configuration.

An overview of the Implementation Process

The Wingfield development proposal therefore provides a case study which depicts an approach to restructuring and intensification in the CTMA. Moreover, it presents a case which may serve as pilot project that inspires future integrated development projects, that attempt to reverse the skewed urban patterns prevalent in the city and collectively shape the CTMA into a more positive urban environment.

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