Spatial dimensions of equitable access
Planning for sustainable transport
WWF South Africa’s Policy and Futures Unit undertakes enquiry into the possibility of a new economy that advances a sustainable future. The unit convenes, investigates, demonstrates and articulates for policymakers, industry and other players the importance of lateral and long-term systemic thinking. The work of the unit is oriented towards solutions for the future of food, water, power and transport, against the backdrop of climate change, urbanisation and regional dynamics. The overarching aim is to promote and support a managed transition to a resilient future for South Africa’s people and environment. The organisation also focuses on natural resources in the areas of marine, freshwater, land, species and agriculture.

This case study was produced under the auspices of the global WWF One Planet City Challenge, which recognises the efforts of cities and towns to provide sustainable housing, transportation and energy for their residents, and take ambitious and innovative climate actions.

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Two residents of Voortrekker Road, one of Cape Town’s transit-oriented development corridors that has been subject to urban sprawl and decay.
INTRODUCTION

South African cities today still battle to deal with the remnants of apartheid spatial planning, making them highly unequal and socially, economically and environmentally inefficient.

Cities such as Cape Town and Johannesburg have a spatial organisation characterised by low-density urban sprawl, fragmentation and separation between residential and employment spaces. This has resulted in constrained access to opportunities.

Most African cities, like Lusaka (Zambia) and Kampala (Uganda), are similarly hampered by the legacy of colonial planning. This includes historic segregation that fashioned remote dormitory towns and settlements to specifically house the non-European labour force, meant only to serve adjacent cities. Workers and the poor now live in these marginalised dormitory townships and informal settlements situated on the outskirts of cities.

Persistent spatial inequality imposes a considerable cost on the state and the environment, and increases the socio-economic marginalisation of the poor. Although sustainable transport solutions provide an array of strategies to deal with urban fragmentation, they require more effective spatial planning that moves beyond a strict mobility concern to a focus on equitable access and social organisation.

This case study investigates spatial planning interventions in Johannesburg, Cape Town and the local municipality of KwaDukuza in KwaZulu-Natal that have the potential to promote sustainable urban development. It provides: (a) examples of South African practice, (b) lessons from past and current planning challenges to apply to future interventions, and (c) the opportunity to address past spatial inequalities and contribute to an equitable and low-carbon society and economy.
The critical role of spatial and transport planning is necessitated by the large-scale urbanisation and sprawl in the growing and pressured urban areas of today. Spatial access relates to whether urbanites can reach services and opportunities where they work, socialise and live with relative ease.

The issue of equitable access is particularly relevant in the context of South Africa and other African cities where urban areas are dealing with legacies of apartheid and colonial spatial organisation, and the similarly fragmented socio-economic landscape. Today, there is an increased focus on merging sustainability and transport to achieve sustainable urban mobility. The push towards this agenda has been visible in South Africa since the planning for the 2010 FIFA World Cup. At the heart of sustainable transport is equitable access, which is grounded in sustainable development, the integration of various sectors and levels of government, supportive frameworks, technical capacity and an engaged public (Yigitcanlar et al, 2010).

Transit-oriented development (TOD) is an agenda that has been pushed in cities across the world to reduce urban sprawl and make areas more compact and integrated around transport developments. Corridors are one mechanism to achieve optimal planning through the concentration of transport infrastructure, mixed land use and residential densification along a particular route. It is argued that corridors directly support the principles of urban integration and densification by functioning as a mode of mobility and accessibility and ensuring ‘quality urban environments’ (Warnich & Verster, 2005). This trend has also taken root in South Africa.
Importantly, equal spatial planning is not necessarily equitable. It is suggested that strategies and policies be data-driven and moulded to the local context to avoid unwanted ‘spatial bias’ (Rabe et al, 2015). Sustainable urban and transport planning maintains a balance between mobility and accessibility and is supported by urban policies and strategies that promote healthy, affordable, safe and environmentally friendly transport options (Malekafzali, undated). This could drive the South African effort of moving beyond spatial and economic exclusion.

The distribution between private car owners and public transport has skewed passenger transport delivery in South Africa. Historically, infrastructure was developed to serve the ‘white’ population. Increasing car ownership levels were associated with major highway construction programmes that facilitated the growth of extensive low-density suburbs (Cronin, 2010). This pattern has persisted as people enter the middle class, and is self-reinforcing as private vehicles remain the only mode that is convenient. There has emerged a widespread belief that the most obvious transport ‘need’ is a private car.
EXAMPLES OF SOUTH AFRICAN SPATIAL PLANNING INTERVENTIONS

KwaDukuza’s Transport Planning, KwaZulu-Natal

Context

The KwaDukuza Local Municipality falls under the Ilembe District Municipality on the north coast of KwaZulu-Natal. Located within the eThekweni–uMhlatuze / Richards Bay Provincial Corridor, it is home to over 200 000 people (KwaDukuza Municipality, 2015). Described as the ‘development engine’ of the district, it is also one of the fastest-growing areas. While KwaDukuza has a well-developed transport system comprising road, rail, port and air transport, with the N2 freeway and the R102 providing major regional connectivity, KwaDukuza Municipality is experiencing several barriers to expanding its mobility and transport networks (IYER Urban Design Studio, 2011). Spatially, the landscape is fragmented, sprawling and car-oriented. KwaDukuza’s spatial and transport challenges have been inherited from past planning and policy decisions. In particular, and in addition to segregation and apartheid planning, these challenges have been exacerbated by the development of several large, gated eco-estates. These estates have become an enormous ‘design issue’ as private developments have necessitated transport networks to be planned around them.¹

Planning intervention: intention and description

KwaDukuza’s Spatial Development Framework, Integrated Development Plan (IDP) and Local Economic Development (LED) Strategic Framework Action Plan incorporate social, spatial and ecological goals. The municipality aims to shift from a high-carbon, inefficient society to a low-carbon, integrated and compact society with an accessible, public transit-oriented system (Pereira, 2016). Corridor development, for example, forms part of the KwaDukuza 2030 vision and includes the N2 and R102 Development Corridors, which provide a basis for growth and expansion that connects economic and social opportunities. The municipality aims to upgrade existing road infrastructure and provide ‘a robust movement network that balances local accessibility and regional mobility functions’ (KwaDukuza Municipality, 2015: 40). These plans ultimately aim to confront fragmentation.²

¹ Chimene Pereira, telephonic personal interview, 4 May 2017.
² Pereira (see n 1).
Challenges and barriers

Before the devolution to local government, KwaDukuza existed as four separate entities with different town-planning policies. With the Development Facilitation Act 67 of 1995, however, the municipality did not have complete autonomy and lacked municipal capacity. A major challenge has been the division of power: national and provincial authority over road infrastructure often overrules municipal decisions. Today, a private ‘eco-estates belt’ is affecting the poor disproportionately, perpetuating inequality, hindering mobility and the expansion of transport networks and thoroughfares, and causing the rerouting of municipal roads.3 While these developments were highly desired initially, poor attention was paid to future transport and spatial-planning needs. Spatial growth has therefore continued in a fragmented manner (Duminy, 2007). Other challenges include increased development pressure, infrastructure dilapidation, poor public transport facilities, low skills and a lack of electricity supply (KwaDukuza Municipality RCR Project Team, 2009). Also, KwaDukuza is a category B municipality, which implies that there is a particular set of grants that they cannot apply for, such as a desired bus rapid transit (BRT) system.4

Enablers and implementation

KwaDukuza has identified several fundamental factors that are crucial to realising their desired spatial and transport plans:5

- enhanced intergovernmental relations where officials at national, provincial and local level sit together and agree to a common goal

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3 Pereira (see n 1).
4 Pereira (see n 1).
5 Pereira (see n 1).
more stringent and new, context-specific policies to ensure that past mistakes are not perpetuated or repeated, and that collaboration between all stakeholders is enabled

- the alignment of the viewpoints, plans and responsibilities of developers with those of the municipality to avoid unfavourable decision making such as isolated developments

- the consideration of finance and funding, which implies a political power-play and difficult decision-making process about where to prioritise infrastructure spending.

**Environmental considerations (carbon emissions and climate change)**

While the spatial-planning framework is based on sound sustainability principles, its implementation will determine how the municipality's emissions profile evolves and to what extent a low-carbon society is realised. A key point to note is that, even with the inclusion of public transport systems and non-motorised transport, the development of road corridors with nodes and hubs has the potential to also attract a greater flow of low-occupancy vehicles to the road, ultimately increasing emissions.

It is noted that in the 2012 municipal inventory, KwaDukuza's greenhouse gas (GHG) emissions were estimated at 7.3 t CO$_2$ per capita (Rowswell, 2013). These are below the national average of 8.8 t CO$_2$ per capita (The World Bank, undated; SEA, 2015). Increased access to motorised transport for those with limited previous access will unavoidably result in an increase in emissions. It is the extent of this increase that needs to be limited.

**Socio-economic implications**

Planning strategies aim to provide the population with better access to social, economic and environmental opportunities that would stimulate employment and alleviate poverty, past fragmentation and inequality. However, post-apartheid class-based and income-based segregation has been perpetuated by KwaDukuza’s gated communities (Singh, 2014). Ideally, enhanced mobility and access would have several important socio-economic implications for the municipality, namely:

- an enhanced labour pool, stimulated economic growth, employment and GDP-generation facilitated by more businesses and a successfully growing area

- the socio-economic implications of improved transport: residents would no longer have to make use of inefficient, costly and time-consuming transport, which will improve their health and productivity.

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6 Pereira (see n 1).
Cape Town’s Voortrekker Road Corridor, Western Cape

Context

The City of Cape Town is South Africa’s oldest and second largest city, located on the coast of the Western Cape. It is home to just under 4 million urban residents and strives to be a safe, caring, inclusive and well-run city of opportunity. The economy is the second largest in South Africa, contributing 11.3% of the national GDP (CCT, 2013). The City’s transport system is well developed with the MyCiTi BRT system.

Planning intervention: intention and description

The Voortrekker Road Corridor (VRC) is a regeneration effort of one of Cape Town’s transit-oriented development corridors that has been subject to urban sprawl and decay. The VRC is the urban core of Cape Town, linking the city centre to Bellville in the northern suburbs. In light of its strategic importance, the City has developed a Strategy and Investment Plan for the VRC. According to this document, the objective of the VRC programme is to use public-sector resources to leverage private-sector investment for the growth and renewal of the VRC. This recognises the potential of the VRC as a ‘driver of City wide spatial transformation’. Another objective is to further the City’s transit-oriented development by capitalising on existing transport investment in the area (Marks, undated).

Stretching over 19 km and 8 200 ha, the regeneration programme has been ongoing since 2012 as a priority area of the City’s Spatial Development Plan. The programme includes improving the railway system and public facilities, upgrading the physical infrastructure, encouraging residential densification and promoting job expansion, among other things (Marks, undated; Fieuw, 2016).

Enablers and implementation

The VRC is pivotal to achieving the City’s vision of creating a more inclusive, integrated and vibrant Cape Town. It is strategic for a number of reasons. Maitland in particular could realise a vision for a ‘mixed neighbourhood that facilitates social integration, inclusion and co-existence’, and offer approximately 183 000 work spaces (Provoost, 2015). According to the Urban Land Institute (2014), the Bellville CBD has the potential to become ‘a stronger anchor and hub with its own identity’ as it already serves as an important transportation centre. However, in order to achieve this, there is a need for the revitalisation and improvement of existing retail and other businesses around the transportation centre.

A diverse set of public transport options, including trains, buses and minibus taxis, provide transport in the VRC. Since these modes are as vital as the new MyCiTi service, it is important to focus on a corridor that is anchored by them. The area’s proximity to economic infrastructure,
regional markets, household consumers and skills catchments, and the availability of industrial agglomeration are important enabling factors (Marks, undated). With average density levels of between 15 and 20 dwelling units per hectare as well as spare infrastructure capacity, social facilities, unused development rights and undeveloped state-owned and parastatal land, the VRC offers considerable opportunity for residential densification (Borchers & Ndlovu, 2014).

Challenges and barriers

The baseline assessment of the VRC conducted by the City of Cape Town identifies a number of barriers as well as infrastructural, economic and social challenges. In terms of transport, these include poor rail service and station precincts, limited feeder services to rail and missing road links. These are critical given the transit-oriented development focus.

Engagement processes initiated by the Greater Tygerberg Partnership (GTP) and the City of Cape Town identified the divide between different communities as well as a lack of integration between different modes of transport as the main challenges facing the Western Area (Meijer, 2013). Of particular concern is the current lack of connection between Maitland train station and the VRC. The shift from manufacturing and the movement of high-order businesses to Century City, a mixed-use development along the N1, 12 km from the Cape Town CBD, have affected the availability of jobs. A lack of connectivity between the VRC and Century City and the N1 further hinders mobility and exacerbates the lack of access to employment opportunities. There is also a concern about possible capacity constraints given the drive towards higher density within the VRC (Marks, undated). Limited city-owned land presents a considerable challenge in terms affordable housing options, particularly around rail stations.
Modderdam, an area between Bellville and Cape Town International Airport, was a settled community of 2,000, mostly women and children. This settlement began in the early 1970s and was initially occupied by a racially mixed group. Some houses were built by women who worked in Cape Town and wanted to bring their families from the rural areas to live with them, which was illegal under apartheid. In August 1977 and several times thereafter, despite mass protest meetings and public appeals, the apartheid government moved in with bulldozers and flattened the homes to clear the ‘black spots’. Other neighbourhoods in the Bellville area which were destroyed at the time were Unibel and Werkgenot.
Part of the Voortrekker Road Corridor.
Environmental implications (carbon emissions and climate change)

The sector consuming the most energy in Cape Town is transport, at 71%. It is also the largest emitter of greenhouse gases, at 42% (WCG, 2013; CCT, 2015). Residential densification, a critical element of the VRC, is one of the measures cited globally as potentially limiting the growth in GHG emissions associated with urban development. According to a study conducted by Borchers and Ndlovu (2014), under a certain set of assumptions, a potential GHG emissions savings of 47% could be achieved through densification by 2034 if roughly 127% more people were accommodated along the corridor during that period, compared to a baseline where population increases are accommodated through standard low-density sprawl. Emissions would be reduced to 125 900 t CO$_2$ per year under the densification scenario, compared to emissions to the order of 238 000 t without densification.

Socio-economic implications

A number of catalytic projects, including big infrastructure projects such as new rail connections and affordable, higher-density housing developments, are planned for the VRC. These projects are designed to unlock the potential of this corridor to bring about socio-spatial transformation and integrate different land uses, connect diverse communities and bring residents closer to employment and other opportunities. If these aims are achieved, it will have a significant positive impact on the socio-economic conditions of those residing in and moving through the area on a daily basis.

The VRC offers a wide range of economic opportunities owing to the portfolio of commercial, industrial and retail businesses in the area. Existing public resources, such as different modes of transport and other facilities, can be leveraged to unlock additional private investment, which could significantly improve the socio-economic conditions of residents along the corridor. However, given the diverse population within the corridor, careful analysis and understanding of the varying needs and current socio-economic conditions of this population are required to make informed decisions about the most appropriate interventions in particular areas.
Johannesburg’s Corridors of Freedom, Gauteng

Context

Johannesburg is South Africa’s largest and fastest-growing city. Situated in Gauteng, it is home to just under 5 million urban residents. As the country’s commercial and economic hub, it hosts 70% of businesses and contributes 17% to the national GDP (CoJ, 2013). Johannesburg also boasts a diversified network of transport including the Rea Vaya BRT system and the Gautrain (CoJ, 2015). However, owing to its urban form, it is also one of the most fragmented cities in the world in terms of where people work, live and socialise. The reality is that space in the city is running out, necessitating proper planning to make optimal use of the space that is available.7

Planning intervention: intention and description

The City of Johannesburg implemented the Corridors of Freedom (CoF) programme on the concept of ‘re-stitching our City’ (CoJ, undated(a)). It forms part of the 2040 Growth and Development Strategy.8 Priority corridors include the Louis Botha Avenue, Turffontein and Empire Perth Development Corridors. The aim is to form sustainable, safe and holistic human settlements for all, but specifically for low-income and previously disadvantaged groups.9 Further development will extend from the CBD outward, improving the north-to-south and west-to-east linkages.

8 Monteane (see n 7).
The ‘backbone’ of the Corridors of Freedom is public transport, to drive and serve the corridors. As a multi-faceted initiative, the programme promotes urban linkages, densification, public facilities, and industrial, economic and residential expansion. The ultimate purpose is to break away from the spatial legacy of apartheid that has left millions on the periphery. The strategy promotes ‘freedom’ in the sense of reversing historical and persistent spatial fragmentation, providing movement and economic freedom, and ultimately aiming to ‘undo the bad’.

Enablers and implementation

Buy-in from communities living along the Corridors of Freedom, through public participation and involvement in decision making, is crucial, as is political will. The City of Johannesburg also proactively invests in the corridors by securing the necessary infrastructure such as water and electricity, even before approaching the private sector to develop along the corridor. Fast-tracking mechanisms such as the Urban Design Advisory Committee have also been established to review the ‘basket of developments’. Developer Forums screen proposed plans and negotiate outcomes as the private sector invests and makes the policy materialise. Partnerships and clear agreements are also crucial.

The City has identified five success factors critical to achieving its vision (CoJ, undated(b): 146)
- long-term political commitment
- a consolidated capital programme
- institutional arrangements that drive development
- inter-governmental engagements and implementation
- an informed and engaged citizenry.

Challenges and barriers

The Corridors of Freedom programme is a new spatial policy that makes the accurate interpretation by all agents important. However, this is often challenged by old and established ways of operating. The City of Johannesburg has also identified specific challenges for each corridor, such as inadequate urban management or building invasions (CoJ, undated(c)).

More generally, barriers include investor profiles that are driven by the market and disadvantage current property owners. A shift is also needed away from depending on private cars and the perception that public transport is only for commuters from lower-income brackets. Other challenges include dealing with public resistance against the BRT system, and associated low-cost housing and tall buildings that the public perceives as unwanted consequences of the developments. There is also the need for improved marketing, understanding and ownership of the strategy.

10 Monteane (see n 7).
11 Ngcobo (see n 9).
12 Monteane (see n 7).
13 Monteane (see n 7).
14 Monteane (see n 7).
15 Monteane (see n 7).
16 Ngcobo (see n 9).
Environmental implications (carbon emissions and climate change)

Johannesburg’s largest energy consumer is the transport sector, using 70%. It also accounts for the greatest GHG emissions, at 38% of overall emissions (SEA, 2015). The Corridors of Freedom programme focuses strongly on contributing towards a healthy environment, a low-carbon future and eco-efficient infrastructure by encouraging and incentivising non-motorised and public transport (CoJ, undated(d)). The table below gives an indication of the annual savings that could be achieved through moving individuals out of private vehicles and into public transport.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Assumed occupancy</th>
<th>GHG emissions associated with a 20 km return trip (kg/person/year)</th>
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<tbody>
<tr>
<td>Bus</td>
<td>25</td>
<td>165</td>
</tr>
<tr>
<td>Minibus taxi</td>
<td>14</td>
<td>108</td>
</tr>
<tr>
<td>Private car</td>
<td>1</td>
<td>1,000</td>
</tr>
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NOTE: ASSUMES 230 WORKING DAYS IN A YEAR.

In addition, the Corridors of Freedom programme seeks a compact, mixed use of land. Halving the daily commute will also halve the annual GHG emissions associated with transport in the same mode, while improving local air quality and human health.
Examples of South African spatial planning interventions

A view from the Ponte Tower in Berea, Johannesburg, overlooking Saratoga Avenue and showing a Rea Vaya BRT station in the foreground, left.
Socio-economic implications

The Corridors of Freedom programme aims to improve residents’ quality of life by enabling them to ‘work, stay and play’ in the same area. The BRT system has been critical in promoting access to urban facilities and interaction between urban dwellers. Greater transport options help avoid inconvenient and costly travel. Inclusive housing and the clustering of social facilities will also make a ‘multiplicity of facilities’ accessible to all. Gentrification has been an inevitable result of increased property values. However, the City is countering this by proactively consolidating land to create quality spaces for all.\textsuperscript{17} From recent public participation, most residents are concerned about traffic increases, crime and heightened property values. This indicates the need for the strategy to be championed more by local residents.\textsuperscript{18}

\textsuperscript{17} Monteane (see n 7).
\textsuperscript{18} Ngcobo (see n 9).
REFLECTIONS FOR CITIES OR TOWNS

The examples of spatial and transport planning practice in South Africa are used to reflect and extract lessons for future interventions, not only in South Africa but also in Africa.

In the context of a fragmented South Africa, it is critical that planning be accompanied by a special focus on equity and access to accommodate the focus on mobility and movement. In South Africa, the transportation disadvantaged are transport poor based on affordability, availability, frequency, time, travel needs or trip characteristics, safety and personal security. The three case studies – KwaDukuza, Cape Town and Johannesburg – confirm the importance of integrating land-use and transport planning, coupled with a greater understanding of the real-estate market (Brown-Luthango, 2010).

The availability of land parcels is critical to realising the vision for a more inclusive, integrated and compact city, particularly planning around mixed-use, public transport nodes. Cities could put specific measures in place to deal with social exclusion and other unintended consequences of urban processes (Brown-Luthango et al, 2016). There is a need for the provision of safe, quality and accessible urban spaces, transport facilities and infrastructure. Planning correctly for transport will also significantly limit the contribution towards climate change since transport is not only the largest consumer of energy but also the largest emitter of CO₂ in all three cities studied.
KEY MESSAGES

- Spatial- and transport-planning strategies should be more integrated and should emphasise a sustainable agenda by focusing on accessibility and equity alongside mobility.

- Proactive spatial- and transport-planning strategies could contribute to a ‘Reduce, shift and improve’ framework by reducing the need to move people and goods, shifting and improving the nature of transport options to be more sustainable.

- Planning strategies must encourage dialogue among all stakeholders such as different spheres of government, businesses and households.

- Planning interventions must be spatially, socio-economically and physically applicable to the context. Development-oriented transport, rather than transport-oriented development, shifts the focus to place-based factors that would realistically enable the specific spatial development.

- In the context of South Africa – and Africa – as developing regions, questions of reducing transport emissions and moving towards a low-carbon economy cannot be addressed with a divorced view of the spatial dimensions of planning, equity and access.
Worldwide cities are stepping forward to reduce their rapidly increasing carbon emissions from passenger or freight transport. African cities are tackling the provision of accessible and effective transport services in contexts particular to our developing economies and rapid urbanisation patterns. Our cities face issues such as changing lifestyle aspirations, spatial economies with the poor relegated to the peripheries, complementary or clashing interactions between formal and informal transport providers, lack of public investment in transport infrastructure and services, and inherited policies and planning that did not factor in emissions implications.

This is one in a series of publications produced by WWF South Africa’s Transport Low-Carbon Frameworks programme under the auspices of WWF’s global One Planet Cities Challenge (see wwf.org.za/what_we_do/opcc). The transport project aims to provide a platform, expertise and perspectives to support labour, business and government in engaging with the challenges implicit in the shift to a low-carbon economy.